DOCUMENT RESUME

ED 133 425 CE 007 580

AUTHOR	Williams, John G.
TITLE	Vocational-Technical Facility Planning Guide.
INSTITUTION	New Jersey State Dept. of Education, Trenton. Div. of Vocational Education.
REPORT NO	VT-103-537
PUB DATE	76
NOTE	128p.
AVAILABLE FROM	Director of Facilities and Equipment Control, Division of Vocational Education, State Department of Education, 225 West State Street, Trenton, New Jersey 08625 ($3.00)
EDRS PRICE	MF-$0.83 HC-$7.35 Plus Postage.
DESCRIPTORS	Administrator Guides; Agricultural Education; Business Education Facilities; Distributive Education; *Educational Planning; *Facility Guidelines; Facility Inventory; *Facility Planning; Health Occupations Centers; Home Economics Education; Industrial Arts; *Technical Education; *Vocational Education; Vocational Training Centers

ABSTRACT

Designed for school administrators, teachers, advisory councils, and architects, this guide may be used in the planning or constructing of new comprehensive vocational facilities or in adding to and remodeling existing facilities. The guide contains information about general and specialized planning. The general planning information covers the areas of planning the facility, organizing an advisory committee, general building considerations, and planning the curriculum integrated facility. Special planning considerations for programs in agricultural/agribusiness, business and office occupations, distributive education, health occupations, home economics, industrial arts, and vocational technical education are presented in separate chapters for each discipline. The curriculum and other information necessary to enhance and support each of the seven specialized areas are also taken into consideration. (TM)

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VOCATIONAL-TECHNICAL FACILITY PLANNING GUIDE

Prepared By

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New Jersey State Department of Education
Trenton

1976

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PREFACE

The material in this guide is designed to aid school administrators, teachers, advisory councils, and architects in the planning of comprehensive vocational facilities. This guide may be used in the construction of new facilities, additions to, and the remodeling of, existing facilities.

To efficiently utilize this Vocational Technical Planning Guide, the following supplementary guides should be available for reference: Guide for Schoolhouse Planning and Construction; School Sites; School Capacity; Educational Specifications and Instructional Media Center. These guides are available upon request from the Bureau of Facility Planning Services, State Department of Education, 225 West State Street, Trenton, New Jersey 08625.

This guide is not intended to be all inclusive, but will serve as an aid in providing direction in planning a vocational facility. Additional assistance is available by contacting the Director of Facilities and Equipment Control and the individual program area specialists.

When federal and state funding is anticipated for the construction of a vocational education facility, compliance with federal and state regulations and guidelines is mandatory. Additional information concerning those regulations may be obtained by contacting the Director of Area Vocational-Technical Schools, Division of Vocational Education.

PLANNING THE FACILITY

Facility and curriculum development represents a planning process, that, when properly developed, produces a curriculum and facility geared to meet the student's interest, needs, employment opportunities, and needs of the employer. The configurations of the instructional areas surface as a natural evolution of program planning and development. Provisions should be made during this planning process to allow for revision and updating as they relate to changing program and facility objectives or needs.

In deciding on curriculum organization and program offerings, employee and employer requirements, surveys of employment opportunities, and student needs should supplement advisory committee recommendations.

Surveys provide information which enable staff to update their programs as they relate to specific jobs. Formal and informal, written and oral surveys will yield this information. Demographic information and projections by the New Jersey State Department of Labor can provide further input.

Objectives stated in behavioral or performance terms provide distinct parameters for design of the facility. Effectiveness of instruction is measured by the extent to which these objectives are achieved.

Student population characteristics and needs can be assessed through demographic information maintained in the guidance department files, and from student interest surveys.

Utilizing the information obtained thus far, decisions about course design and/or instructional unit design can be made with relative clarity.

The final selection of methodology, content, sequence, materials, media, and equipment culminates the curriculum planning process.

Design and configuration of the instructional area evolves as a natural outcome of the curriculum planning process. Square footage is determined by considering the number of students served, methodology selected, equipment utilized, and storage and ancillary facilities required.

The steps in the curriculum planning and development process (outlined below) can then serve as an evaluating instrument and planning device for both curriculum and facilities.

STEPS IN CURRICULUM DEVELOPMENT, REVISION, AND UPDATING

Program Planning

1 Decide on curriculum organization and select program offerings, based on an assessment of:

- ☐ Employment Opportunities
- ☐ Student Desires and Needs
- ☐ Resources and Constraints

2 Assess employer and job requirements.

Program Development

3 Formulate performance objectives for programs, and select/develop measures of attainment of objectives.

4 Assess characteristics of target populations.

5 Design programs:

- ☐ Courses and other instructional units within programs
- ☐ Instructional strategies and methods, content, sequencing, materials, equipment and media
- ☐ Facility Requirements

6 Implement and conduct programs:

- ☐ Assess entry level skills and knowledges
- ☐ Assess attainment of objectives

7 Conduct follow-up of graduates:

- ☐ Job placement
- ☐ Job performance
- ☐ Employer and job requirements
- ☐ Mobility

Source: AVA Journal, November 1972

5

SELECTING THE TYPE OF FACILITY

There are three basic types of facilities commonly used for vocational-technical education on the secondary and postsecondary levels. The type of facility selected is dependent upon the educational philosophy of the Board of Education, the number of secondary schools located in the area, and the vocational needs of the community the school will be serving.

FULL-TIME SCHOOL

The full-time facility is designed to provide all the secondary education requirements, as well as vocational requirements, at one facility. After completion of this program, the student will receive a standard high school diploma, along with a certificate indicating the skill training for employment.

A full-time vocational-technical facility should have a gymnasium, cafeteria, classrooms, resource centers, and other necessary facilities commonly found in a comprehensive high school.

Students spend one-half of their time in skill training and one-half of their time in the related and required subjects. Extra-curricular activities are also provided.

SHARED-TIME SCHOOL

The shared-time facility provides vocational-technical education exclusively. Related and required subjects, along with extra-curricular activities, are provided in the home school. One half of the students time is scheduled in each school. Students in this type of school receive a standard high school diploma and a certificate indicating completion of skill training for employment.

COMPREHENSIVE HIGH SCHOOL

A vocational-technical facility may be a separate department in a comprehensive high school. Usually, a limited number of programs are offered. Students spend one-half of their time in skill training, and one-half of their time in the related and required subjects.

Extra-curricular activities are also provided. The student receives a standard high school diploma upon graduation.

ORGANIZING AN ADVISORY COMMITTEE

An advisory committee aids in the development of a vocational-technical school facility. The advisory committee's primary objective is to assist in the development of a school plan which will meet the needs of the community it is serving.

Advisory committees provide the necessary communicating links between the school and the community. They are comprised of representative laymen from the local community who are recognized experts in their respective fields. The committee should be comprised of individuals with a variety of experience in labor and industrial areas. Employers and employees, and others interested and knowledgeable in areas related to the vocational needs of the community should make up the committee.

Vocational education has always needed the occupational training input a strong advisory committee can offer. Labor unions and employers can be either opponents or allies of a school, depending on the extent to which they have been consulted about training programs. Both groups want to develop better workers, and both groups will support sound efforts to provide good training. A vocational advisory committee is thus especially valuable.

An advisory committee should be appointed by, and responsible to, the Board of Education. Leadership usually is provided by the Director or Superintendent in charge of vocational education. The word "committee" implies investigation and obligation to the community without the inclusion of legislative or administrative responsibilities.

These committees advise on general topics; sometimes they provide advice on particular phases or programs. Temporary committees often disband when their task has been accomplished. Committees of longer standing often begin their work before a

vocational education program is established. An advisory committee advises the school administration on the types of courses needed to satisfy the day and evening training needs of a community. The advisory committee can be of service to the school administration by aiding in the administration and interpretation of community surveys, suggesting courses to be offered, helping in the determination of courses of studies, and making recommendations of facility and equipment needs. This committee functions during all the facility planning stages of vocational schools.

DETERMINING EDUCATIONAL NEEDS

Vocational Education needs of the community are the basis for planning a vocational school. To determine these needs, a survey should be undertaken to assess student interest and employment opportunities.

This survey identifies the makeup of the student body that will attend the school, analyzes the existing vocational programs currently available to students, determines

current and future employment trends of the community to be served, classifies interests and aspirations of the students, determines the nature of programs anticipated, and projects enrollments for the planned vocational facility. Additional information concerning how to conduct surveys is available upon request through the Division of Vocational Education, New Jersey Department of Education.

NOTIFYING DEPARTMENT OF EDUCATION

During the early stages of planning a vocational school facility, contact should be made with the State Department of Education. The Division of Vocational Education offers services and information dealing directly with facility construction and criteria that must be met for funding. If federal and state funding of a school facility is anticipated, federal and state standards and regulations are applicable. Appropriate forms and applications are available upon request from the Director of Area Vocational-Technical Schools, Division of Vocational Education.

PREPARING EDUCATIONAL SPECIFICATIONS

Educational Specifications are written statements which specify what is to be required of a proposed educational facility. These specifications are developed by the administrative staff and various committees designated by the administrator.

The Outline of Educational Specifications which follows may be used for organizing the entire document.

I. Background Information
   - A. Purpose of school
   - B. School's philosophy
   - C. Local community educational needs

II. Population Characteristics
   - A. Psychological and physiological nature of pupils to be served
   - B. Ages of pupils
   - C. Projected enrollments
   - D. Number of administrators and staff

III. Educational Program
   - A. Objectives of program
   - B. List of activities

C. Amount of time devoted to each activity.

D. Relationship spaces have to one another

E. Number of spaces needed for each activity

1. Location
2. Size
3. Number of students in each space

F. Listing of unique teacher-learning methods to be used

IV. Auxiliary Services

Definition of non-classroom areas

1. Administration
2. School Nurse
3. Guidance
4. Faculty
5. Special Services Personnel
6. Kitchen Staff
7. Custodial Staff

V. Physical Features of Building and Site

Listing of all special physical features required to meet the needs of programs and activities stated in general terms.

VI. Future Expansion, Adaptability and Flexibility of Space

Provisions made for anticipated changes

1. Population
2. Programs

A section of the Educational Specifications Document should call attention to miscellaneous building features which are not covered in the detailed room description. Through careful interpretation of the Educational Specifications, the architect should be able to determine the size, shape, and special features required of the new facility. The architect should be allowed flexibility in developing a facility design which meets the school's educational requirements.

Educational Specifications should be developed for all forms of facility construction; new facilities, additions, and renovations.

SELECTING THE ARCHITECT

The selection of an architect is an important responsibility of the Board of Education in the development of a new facility. Considerations to be made in this selection are: professional reputation, reliability, experience, staff and facilities and quality of work.

The architect's past experience can be evaluated during an interview. A tour of recent facilities designed by the architect is recommended.

After several architects have been interviewed, and a final selection has been made, obligations and responsibilities of all parties concerned should be defined. A formal contract should then be offered by the Board of Education clearly listing the terms of the contract.

SELECTING THE SCHOOL SITE

Site selection and development have an important relationship to the vocational educational needs of the community. Well-planned site development and utilization contributes to the successful operation of the school plant. Employing the services of an architect at this time is desirable.

The following characteristics should be considered prior to the acquisition and development of a school site:

1. Size and Shape

   A minimum of 30 acres plus one acre for each 100 students (or fraction) of projected maximum enrollment for the planned facility is recommended by the Bureau of School Planning Services. Allowances should be made for parking, athletic or recreational needs and the possibility of future expansion or development. The shape of the site may determine the size or design of the facility. Careful consideration has to be given to the location of the facility on the site. Efficient and safe

access, future expansion, solar orientation, and visual aesthetics are of prime concern.

2. Site Characteristics

Complete soil test borings to determine sub-soil conditions are necessary. Poor drainage, rocky sub-soil, poor bearing soil, lack of water and inadequate percolation are conditions which could make a site undesirable. The cost of correcting such characteristics could become extremely high. Studies should be made of the program requirements and their relationship to the site.

3. Accessibility

The travel distances of students are a major consideration in school location. Central positioning of the school within student population areas enables efficient transportation and scheduling. The general public, who

will be attending special programs and adult night classes, should be considered. Adequate parking for night classes must be provided. Good highways located away from heavy traffic patterns should be near the site. Safe, pedestrian and emergency vehicular access and egress are important.

4. Environment

The nature of an educational facility requires quiet, safe conditions. Sites located next to industry and heavy ground and air traffic should be avoided. The surrounding community and the proposed new facility should be in harmony with each other. The location, as well as the appearance of the facility, should add to the beauty of the area. Planning and coordinating should be done with the local planning and zoning authorities. Local, state, and federal environmental regulations must be followed. Environmental Impact Studies must be completed and submitted to the U.S. Office of Education, Region II; the New Jersey Department of Environmental Protection; and the

Director of Facilities and Equipment Control, Division of Vocational Education, New Jersey State Department of Education.

5. Services

If sewer and water are not available on the site, public utilities should be available at a reasonable distance. Gas and electricity should also be available at a practical cost.

As the above characteristics indicate, site selection should be carefully analyzed because it is an integral part of a building program.

DESIGNING THE BUILDING

Educational specifications define the content and function of an educational facility. The Architect, using the educational specifications as a guide, designs the physical facility to meet the educational needs. One of the many goals of the architect is to keep the cost of the facility within the financial parameters, while providing a functional but esthetically pleasing facility.

Extravagant educational facilities should be avoided. It is important that a vocational facility be an attractive asset to the community it is serving and still be reasonable in cost.

ADAPTABILITY

Anticipating future needs or demands which will be placed on an educational facility is essential in designing a school. Basic considerations for future expansion should be considered, as well as the designing of utility services so that expansion of the facility in the future can be accomplished at minimal cost. Also, consideration should be given to the location of the facility on the site to allow for future expansion.

NEEDS OF THE PHYSICALLY HANDICAPPED

All schools, by law, are required to provide facilities for the physically handicapped. Careful consideration should be given to all classroom and shop features and their relationship to the handicapped.

GENERAL BUILDING CONSIDERATIONS

The following, are some of the features required in a public school:

- Access ramps for each corridor level change.
- Access ramps to shops where necessary.
- Exterior ramps from parking lots.
- Elevators for buildings with more than one floor.
- Toilets for each sex with facilities designed for wheel chair pupils on each floor.
- Drinking fountains to accommodate the handicapped on each floor.
- Telephones accessible to wheel chair pupils.
- Flexible work surface heights - adjustable for wheel chair pupils.

When the school district sends its physically handicapped students to a non-public school, the physical facilities are subject to approval by the County Superintendent of Schools in the county in which the facility is located or by an official representative of the State Department of Education.

Detailed information on designing facilities for the handicapped is available by contacting the State Department of Education, Division of Vocational Education, Bureau of Special Programs, 225 West State Street, Trenton, New Jersey.

ADMINISTRATIVE OFFICES

Administrative, board secretary, business managers, and supervisory services in a vocational school may vary from those found in the traditional comprehensive high school. Adequate space for staff, such as counselors, program coordinators, apprenticeship training, and adult education coordinators should be provided.

The space need of each administrative position, secretarial needs of the position, and its relationship to other administrative and school functions must be carefully studied.

HEALTH AND FIRST AID SUITE

This area should be located as close to the gymnasium and heavy accident area as possible and should consist of a waiting room, an examining room, a resting room, and toilet facilities.

MECHANICAL ROOMS

When at all possible, mechancial rooms and equipment should be located in the part of the school where mechanical noises will not disturb classroom and administrative functions. Acoustical isolation of these areas is essential.

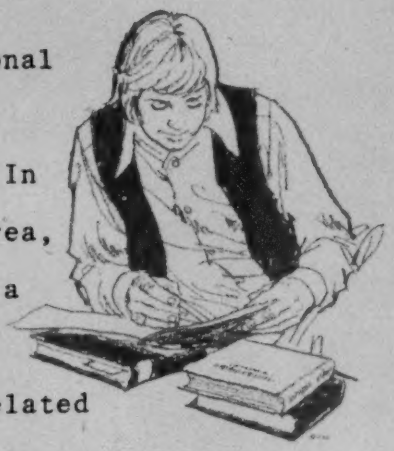
CLIMATE CONTROL

The clustering of areas which require special climate considerations is desirable. Careful consideration should be given to the feasibility of year round climate control, the areas which require climate control, the overall cost of providing climate control, and techniques that can be employed to conserve energy.

CLASSROOMS

The vocational school's program will determine the type and number of classrooms required. Additional information on classrooms may be found in the "Guide for Schoolhouse Planning and Construction," Bureau of Schoolhouse Planning.

REFERENCE AREA



It is suggested that each instructional area have space designated for reference materials, audio-visual materials, etc. In addition to the instructional resource area, a general instructional media center and a related equipment storage area should be provided. Such an area should support related subjects, audio-visual needs of the school, and small group and independent study stations.

FOOD SERVICE AREA

The location and the design of the food service area is determined by the type of school and program requirements. Full-time schools require food preparation and dining areas for school lunches. Some schools may require only a small student-dining area or

vending machine area, but a dining area should be included which will enable students to obtain practical experience in food preparation and serving. Portable equipment, movable partitions, etc., will enable the dining area to be used for large group instruction, assemblies, etc. This area should not be located near shop areas where vapors or odors could penetrate into the foods area.

PLANNING THE CURRICULUM INTEGRATED FACILITY

Determining sizes of instructional areas is a planning process which takes place prior to the development of educational specifications and after the curriculum planning process. Space requirements vary considerably in each instructional area.

The selection of programs, the instructional methods to be used for each program, and the number of students to be assigned to each program (capacity) will determine such space requirements.

The following procedure, when used with the facility planning sheet in conjunction with the curriculum planning guide, will aid

the facility planner in determining space requirements for each instructional area.

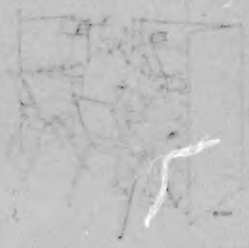
Work Station Area

Each student is assigned to a specific space module or work station. The size of this space module varies depending upon the size, type or model of equipment being used, and material handling area around the equipment and/or the work activity taking place. Major and minor equipment is used by one student at a time. For bench and multiple student work stations, the number of students divided by students per work station equals the number of work stations. The number of work stations times the space module in square feet equals the modular area per type of work station. The total of each modular area times the circulation factor (1.25) will provide the net area needed for work stations.

Lecture Areas

Where lecture areas are desired, the total module area needed can be determined by multiplying the number of students to be accommodated in the area at one time,

times the space needed for each student, times a circulation factor (3.0) allowing for student movement.



Resource Area

Resource areas are frequently located within the instructional area. The number of students to be served (with consideration given to the activity planned for the resource center) times the space required for each student, times a circulation factor, (1.25) will provide the net area required.

Storage Areas

The requirements for storage vary considerably. EQUIPMENT, SUPPLY, MATERIAL, AND PROJECT storage areas each require specific amounts of space. The area of each type of storage module must include adequate circulation.

Lavatory/Locker/Wash-Up Area

Student lavatory facilities are usually found within the vocational instructional area. School policy will determine the location and number of such facilities required.

Depending upon wash-up equipment used, this area can be designed to accommodate a varying number of students at one time. The space need for each student, times the number of students using the area, times a student circulation factor (1.35), will provide the net module space for this area.

The total net area required for a particular instructional area or cluster is the sum of the net areas.

FACILITY PLANNING WORKSHEET

Instructional Area _____ Student Capacity _____

(A) WORK STATIONS

Type of Work Station	Number of Students ÷	Students Per Work Station =	Number of Work Stations ×	Space Module (sq.ft.) =	Modular Area
Major					
Minor					
Bench					

Total Modular Area For Work Stations

Circulation Factor X 1.25

NET AREA

(B) LECTURE AREA

Number of Students ×	Space Module (sq. ft.) =	Modular Area ×	Circulation Factor =	Net Area
	9		3.0	

(C) RESOURCE AREA

	24		1.35	

(D) STORAGE AREA

Equipment Storage (sq. ft.) +	Supply Storage (sq. ft.) +	Project Storage (sq. ft.) +	Misc. Storage (sq. ft.) +	Evening Storage (sq. ft.) =	Net Area

(E) LAVATORY LOCKER WASH-UP AREA

Space	Number of Students ×	Space Module (sq. ft.) =	Modular Area ×	Circulation Factor =	Net Area
Lavatory		18		1.35	
Locker		15		1.35	
Wash-Up		30		1.35	

Total Net Area For Instructional Area

COMMENTS:

_____

_____

_____

SUMMARY

Prior to planning a new vocational education facility, a philosophy of vocational education should be developed. Adherence to this philosophy should be of prime concern in the design of the facility. If future educational needs of the community the school is to serve are to be met, master planning is essential. Flexibility in facility design, which allows for enrollment fluctuations and changes in training programs to meet the needs of new trades and industries, should be incorporated into the school.

A joint effort is necessary among administrators, teachers, consultants, architects, and advisory committees with the mutual goal of providing the best possible educational facility for effective vocational education.

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SCOPE

Agriculture/Agribusiness/Natural Resources/ Horticulture Occupational Training

Agriculture/Agribusiness Natural Resources Education provides students with competencies in the following seven clusters of employment:

1. Ornamental Horticulture
2. Agricultural Mechanics
3. Natural Resources/Environmental
4. Agricultural Production
5. Agricultural Supplies and Service
6. Agricultural Products
7. Forestry

Personal and leadership development are provided through the intercurricular use of the vocational student organization, FFA.

Some programs are approached in a comprehensive manner and include a combination of agriculture/agribusiness/natural resources clusters. Other programs may provide more specific occupational training in one cluster of employment. The selection of a cluster or clusters will depend upon the occupational needs of the community. Individualized training in a particular occupation is provided through a supervised occupational experienced program. This program is set up by the teacher and student. It is conducted both in and out of school under the supervision of the instructor.

This section of the facilities planning guide does not include recommendations for all possible types of agriculture/agribusiness/ natural resources programs. The types of programs listed are usually found in New Jersey and in the Northeastern United States.

It should be noted that the facilities and equipment for instruction may extend beyond the building proper. A well-planned and designed classroom and laboratory area in the school complex adds to the quality of instruction. However, in certain programs a land laboratory should be provided on or near the school site.

The Classroom

The vocational agriculture/agribusiness/natural resources classroom differs from the general classroom. Provision should be made for both laboratory experiences and demonstrations. A demonstration table with acid proof top, sink, gas, water and electrical connections should be provided in the front of the room. Forty-eight square feet of chalk board and an equal amount of bulletin board space should be provided.

A storage area for charts, models and specimens is necessary. A reference area (small media center) for the display and storage of agricultural books, periodicals and self teaching devices is also needed. Specific needs for agricultural occupations are not usually found in the library.

The use of visual aids is an important part of all instruction. The classroom windows and doors should have room darkening shades or blinds. A retractable screen for the projection of film strips, slides, motion pictures should be provided. A permanently mounted screen angled to prevent the "Keystone Effect" should be provided for the overhead projector. Outlets in the classroom should be planned for the audiovisual equipment.

A special notebook rack or self should be provided for the storage of the student notebooks and/or record books.

The classroom should adjoin the shop/laboratory area. There should be a definite partition between the classroom and the shop area with as many glazed windows as possible to provide observation between areas.

The Office-Conference Area

An office-conference room should be provided adjacent to the classroom and shop.

Glazed partitions should be constructed between the office, classroom, and shop/laboratory, to enable teachers to supervise students in both rooms simultaneously. Doors should open into both the classroom and shop from the office if possible.

Phone service should be available to teachers in the office-conference area as this room serves as an office and headquarters for the instructor(s). Instructors act as supervisors and placement coordinators in supervised occupational experience programs. The facility is often in use for instruction, adult classes, conferences and meetings when the rest of the school is not in session.

The Agricultural Mechanics Shop/Laboratory

Agricultural mechanics shops or laboratories are designed to permit the teaching of competencies required for agriculture/horticultural/agribusiness/natural resources occupations.

Various kinds of greenhouse construction are suitable for instructional purposes. The kind of greenhouses used in vocational instruction should be the type(s) students will work with once employed. Polyethylene or vinyl film covered greenhouses in school situations, are not recommended because of the possible loss of the entire greenhouse crop due to the covering being ripped or cut. All polyethylene or vinyl films must be replaced yearly or once every two years.

Standard commercial type aluminum or galvanized steel frame houses erected on concrete block foundations are desirable. These houses are available with glass and fiberglass coverings. At present fiberglass with tedlar coating is guaranteed to last 10, 15, or 20 years and appears to be most suitable in a school situation. Glass coverings are long lasting but expensive. They may cause a vandalism problem when not protected in some manner. There are some vandal proof glazaing products on the market but their cost at this time appears prohibitive.

Less expensive greenhouse frames other than aluminum are available. Some without the concrete block foundations which will reduce cost. A pipe frame quonset and redwood frame gothic house is available with a fiberglass or polyethylene/vinyl coverings. Both types of houses are acceptable but they are semi-permanent structures.

Greenhouse benches may be constructed of many different materials. Most greenhouse benches are built so that the top edge is 30 inches from the floor - a convenient height for most students. A convenient working width is 40 to 42 inches. It is recommended that the benches be constructed so that they are flexible and movable. Some bedding plant and vegetable production will not require the use of benches. The maximum amount of bench space should be provided yet space for the handicapped must be considered.

Germination of seed and rooting of cuttings is done in commercial greenhouses under a fine spray of water distributed over a greenhouse bench by means of misting system. One bench 10 running feet should be set up with plumbing for this purpose.

The greenhouse should have concrete or masonary walk ways. The area under benches should be covered with gravel stone and should not be paved.

The greenhouse should have two exits - one at each end. It is recommended that one of these exits be at least 6 ft. wide to allow occasional use of power equipment in the greenhouse.

Since the greenhouse environment must be maintained 24 hours a day, water, heat, light and electric power must be available at all times.

The school's heating plant may be connected to the greenhouse or a separate heating system may be provided. The temperature control accuracy must be within 1 degree F. in any part of the house or zone of the house. Thermostatic controls must be shielded from the sun and tamper proof to maintain accuracy. Greenhouse heating systems are available in steam, hot water and hot air systems. If a separate system is provided it should be located in a one hour rating fire resistant room.

In the agricultural mechanics shop, a minimum amount of bench space and a miximum amount of floor space is needed. The nature of the materials and equipment involved in the instructional process requires adequate space for the service and repair of tractors, wagons, implements, and the construction of equipment and structures.

The space allotment should be planned and arranged into sub-areas devoted to specific instructional units provided in the curriculum. These normally include:

a. building construction and glazing
b. cold metal, plumbing, sheet metal and soldering
c. welding and hot metal work
d. engine and machinery repair, maintenance and overhaul
e. electrification
f. soil and water management
g. painting

An overhead type outside door size of 10' high by 14-16' wide is recommended. A small personnel door adjoining or built into the large overhead door is desirable for safety considerations and to prevent heat loss.

Space for a level surface entrance at least 10' x 12' (with drain) outside the large shop door is needed for the service, maintenance, and repair of machines and equipment too large to fit into the shop-laboratory.

Provision should be made for storage of large projects. Such projects, materials, supplies, equipment, and tools can be stored in an outside gravel or paved area if a fence and 16' gate is provided. The area might have a roof or semi-enclosed shed to provide protection to some projects, equipment and materials. A loading ramp for moving equipment onto and off trucks is recommended.

The Greenhouse

A well designed and equipped greenhouse is essential to provide hands on experiences in the propagation and growing of plants. The need for the size and type of greenhouse will vary depending on the program.

The greenhouse should be directly connected to the agricultural shop/laboratory so that plants and materials can be moved from the greenhouse to shop/laboratory without going outside. If a greenhouse is located away more than 50' from the laboratory-shop an attached head house area should be provided. The work area adjacent to the greenhouse which can be the shop/laboratory should provide for storage of tools, supplies, soil, and pesticides. It should also include work benches for potting, making cuttings and arranging flowers. The greenhouse structure is primarily an environmental area for plants, therefore, it should not be used for storage, potting or classroom instruction.

The greenhouse ridge line should run east and west to minimize shade from its roof supports. It must be positioned so midwinter shadows of nearby structures do not fall on the greenhouse. Sunlight is a major concern during the winter months.

An automatic ventilation system is needed in all greenhouses. This can be either by fan ventilation and/or ridge ventilation. School greenhouses should also be equipped with a device for providing air circulation within the house at all times. This prevents certain diseases by removing moisture from leaf surfaces. The greenhouse should include an evaporative cooling system to extend the growing season if the house is used during the summer months.

Greenhouse lighting and electrical outlets should be moisture proof types. Outlets should allow flexibility for temporary lighting of plants and for soil heating cables and mats. Lighting from other sources should be considered which will prevent certain plants from flowering. Such sources are head lights, anti-theft lighting, and street lights.

Retail Sales Area

This area should include a wrapping counter, cash register, adding machine and display area. A refrigerator display case should be provided if floral design units are included in the curriculum.

Turf Plot

If the instructional program includes turf and ground management a turf plot of 30' x 60' for experimental work should be provided. A golf green is also recommended.

Nursery

If the instructional program includes a nursery management unit a lath house is needed. The size is dependent on the depth of instruction. A nursery plot with provision for an irrigation system should be provided. The size of the plot should be large enough to provide adequate hands on experience.

Land Laboratory

Provide a site on or adjacent to the school grounds of sufficient size so that students have an opportunity to develop skills. The size of this land laboratory should not present maintenance problems with the possibility that instruction is neglected. Consideration must be given to performance or tasks for learning versus routine maintenance tasks required for a large site. Special facilities on the land laboratory are dependent on the type of program offered.

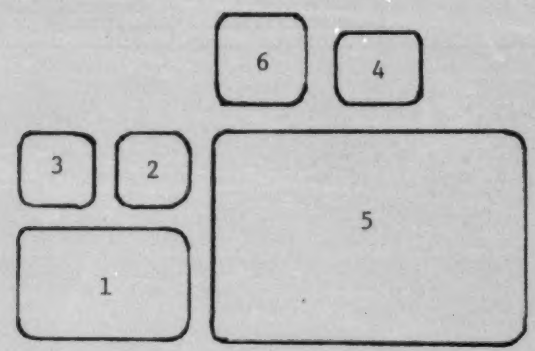
OE # 01.03 Agricultural Mechanics

Program Activities

Classroom instruction, shop and laboratory experiences relating to the service and repair of a variety of agricultural equipment and machinery.

Experiences relating to the construction and repair of agricultural structures.

Instructional Area



1. Classroom
2. Lockers
3. Office/Conference
4. Tool Room
5. Shop/Laboratory
6. Spray Painting Area

Utility Requirements

Compressed air.
Exhaust system for internal combustion engines (small and large).
Both 110v and 220v electrical outlets.
Ventilation for welders.
Ventilation for spray painting area.

Special Features

Fenced area adjacent to the shop.
Ceilings should be a minimum of 15 feet.
A paved outdoor area with drain should be provided for cleaning equipment.
Overhead door 14 ft wide for large agricultural machines.

Equipment

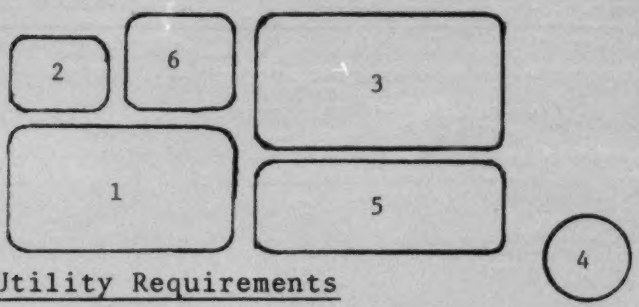
Steam cleaner.
Parts washer.
Valve grinder.
4 Arc welders.
2 Oxy-acetylene welders.
Bench grinder.
Drill press.
Chain hoist.
Utility tractor.
Arbor press.

OE # 01.0101 Agricultural Production - Animal Science

Program Activities

Classroom and hands-on experience involve the development of competencies in the production and marketing of animals and animal products and related services. Meaningful instruction should focus on the commercial application of scientific information.

Instructional Area



1. Classroom
2. Office/Conference
3. Shop/Laboratory
4. Land Laboratory
5. Animal Care Area
6. Lockers

Utility Requirements

Both 110v and 220v outlets.
Ventilation for animal area in laboratory.
Exhaust system for small and large internal combustion engines.
Exhaust system for welders.
Water supply required in all animal care areas.

Special Features

Land laboratory that includes the development of animal care areas such as kennel, stable and/or barn.

A separate ventilated area in shop/laboratory for housing small animals for intensive care purposes.

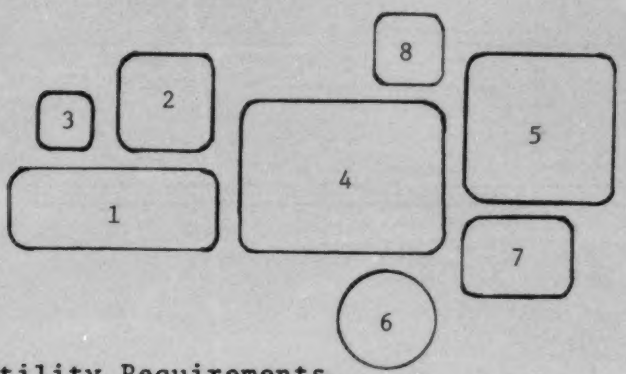
Equipment

Steam cleaner.
Parts washer.
Washing facility (for animals.)
Animal scale.
Power hack saw.
Tilting arbor saw.
Bench grinder.
Drill press.
Arc welder.
Oxy-acetylene welder.
Animal care cages and pens.
Animal squeeze.

OE # 01.0102 Agricultural Production - Plant Science

Classroom and hands-on experiences involve the development of competencies in the production and marketing of plant materials. Meaningful instruction should focus on the commercial application of scientific information.

Instructional Area



1. Classroom
2. Office/Conference
3. Sales
4. Shop/Laboratory
5. Greenhouse
6. Land Laboratory
7. Tool Room
8. Lockers

Utility Requirements

Separate heating and ventilation control for greenhouse.
Both 110v and 220v electrical outlets.
Exhaust system for small and large internal combustion engines.
Exhaust system for welders.
Water supply required in greenhouse.

Special Features

Land laboratory is important to this program. Areas to be developed in the land laboratory are arboretum, student gardens, nursery and orchard.

Large overhead door at least 12' wide x 10' high.

Soil bins for greenhouse should be provided.

Greenhouse should be of sufficient size to provide meaningful daily activity during the winter months.

Equipment

Steam cleaner.
Chain hoist.
Power hack saw.
Bench grinder.
Drill press.
Arc welder.
Oxy-acetylene welder.
Cash register.
Utility tractor.
Soil sterilizer.
Power sprayer.
Proportioner.
Roto-tiller

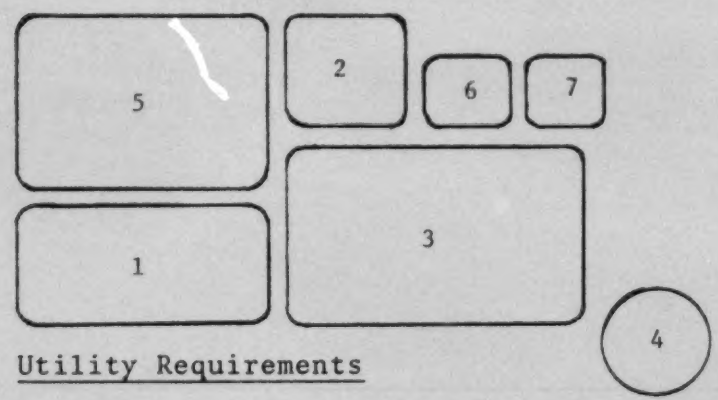
OE # 01.0298 Agricultural Sales and Service

Program Activities

Classroom and hands-on experience involve the development of competencies for providing supplies and services to agricultural production enterprises.

Meaningful activity should be developed around a sales area emphasizing product knowledge.

Instructional Areas



1. Classroom
2. Office/Conference
3. Laboratory/Shop
4. Land Laboratory
5. Sales Area
6. Tool Room
7. Lockers

Utility Requirements

Both 110v and 220v electrical outlets.
Exhaust system for welder.
Exhaust system for small engines.

Special Features

Adequate space for the development of a garden and/or supply center and/or produce market.

Land laboratory developed for demonstrations of products and techniques.

Equipment

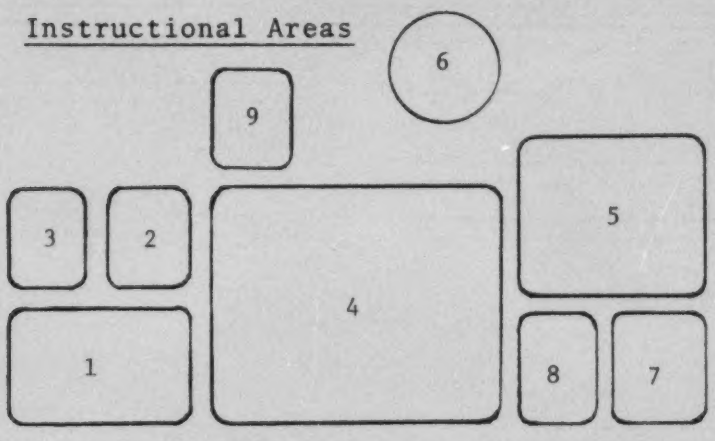
Cash register.
Sales and display equipment.
2 Arc welders.
Drill press.
1 Oxy-acetylene welder.
Steam cleaner.
Bench grinder.

OE # 01.01 Comprehensive Agricultural Production

Program Activities

Classroom and hand-ons experiences involve development of competencies in scientific agriculture with plant and animals. Meaningful experiences should be the commercial application of a core of competencies required by many occupations in agriculture/agribusiness/natural resources. Individualized training in a particular occupation will be provided by the supervised occupational experience program conducted both in and out of school.

Instructional Areas



1. Classroom
2. Office/Conference
3. Sales Area
4. Shop/Laboratory
5. Greenhouse
6. Land Laboratory
7. Spray Painting Area
8. Tool Room
9. Lockers

Utility Requirements

Compressed air for spray painting.
Separate heating and ventilation control for greenhouse.
Both 110v and 220v electrical outlets.
Exhaust system for welders.
Exhaust system for small and large internal combustion engines.
Exhaust system for spray painting area.

Special Features

Fenced in area for storage of large equipment and supplies.
Large overhead door at least 12' wide x 10' high.
Ceilings should be at least 15' high.
Overhead trolley for chain hoist.
Soil bins.

Equipment

Steam cleaner
Parts washer
Chain hoist
Power hack saw
Tilting arbor saw
Drill press
2 arc welders
2 oxy-acetylene welder
Bench grinder
Cash register
Utility tractor
Soil sterilizer (electric)
Concrete mixer
Fertilizer proportioner

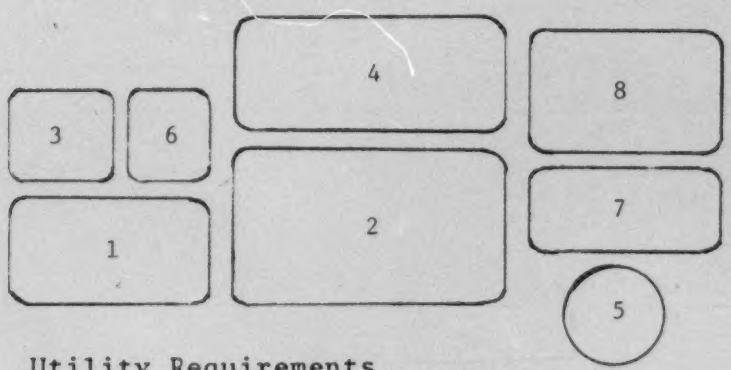
OE # 01.0598 Comprehensive Ornamental Horticulture

Classroom and hands-on experiences involve development of competencies in the field of ornamental horticulture which include the following major areas:

1. Landscaping and ground maintenance
2. Floriculture and floristry
3. Turf management
4. Greenhouse management
5. Nursery management
6. Arboriculture

It is important that competencies be developed using professional techniques and equipment. More intensive training in a particular area of ornamental horticulture will be provided by the supervised occupational experience program conducted both in and out of school.

Instructional Areas



1. Classroom
2. Shop/Laboratory
3. Office/Conference
4. Greenhouse
5. Land Laboratory
6. Sales area
7. Lockers
8. Tool Room

Utility Requirements

Separate heating and ventilation control needed for the greenhouse.
Both 110v and 220v electrical outlets.
Exhaust system for small and large internal combustion engines.
Exhaust system for welders.
Water supply required for greenhouse and nursery.

Special Features

A land laboratory is an important element of the program. Areas to be developed in land laboratory are arboretum, nursery, lath house, turf plot, golf green, and orchard.
Overhead door at least 10 feet wide x 10 feet high for the shop/lab.
Ceilings should be at least 12 feet high.
Soil bins are required for the greenhouse potting area.
Greenhouse should be of sufficient size to provide meaningful daily activity during the winter months.

Equipment

Steam cleaner.
Parts washer.
Soil sterilizer.
Power sprayer.
Tilting arbor saw.
Bench grinder.
Roto tiller.
Drill press.
Arc welder.
Oxy-acetylene welder.
Cash register.
Florist refrigerator.
Utility tractor.
Fertilizer proportioner.

OE # 01.0502 Floriculture and Floristry

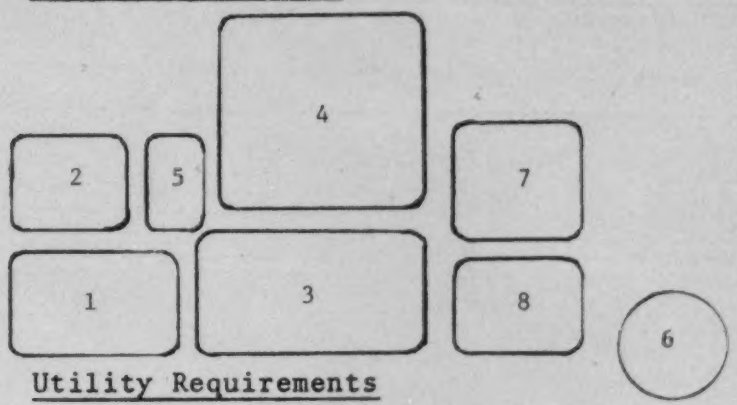
Program Activities

Classroom and hands-on experiences involve development of competencies in the production and sale of flowers and ornamental plants.

Experiences should include training in commercial methods of production and marketing.

Supervised occupational experience placement will provide on-the-job experience required for the occupation.

Instructional Area



1. Classroom
2. Sales Area
3. Shop/Laboratory
4. Greenhouse
5. Office/Conference
6. Land Laboratory
7. Lockers
8. Tool Room

Utility Requirements

Separate heating and ventilation control for the greenhouse.
Both 110v and 220v electrical outlets.
Water supply with adequate volume and pressure for the greenhouse.
Florist sales area should include a refrigerated display case or walk-in cooler.

Special Features

Land laboratory should include cold frame, flower garden and growing areas.
Overhead door 10 feet wide for delivery of soil and supplies.
Soil bins are required near laboratory potting area.
Greenhouse should be large enough to provide sufficient activity area for each student.

Equipment

Soil sterilizer.
Soil shreader.
Power sprayer.
Tilting arbor saw.
Drill press.
Cash register.
Florist refrigerator.
Roto tiller.
Fertilizer proportioner.

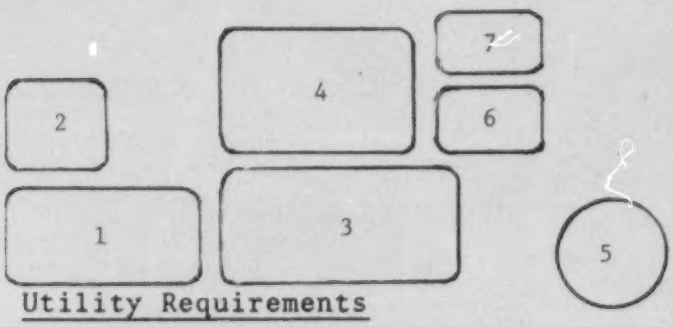
OE # 01.0504 Grounds Maintenance and Landscaping

Classroom and hands-on experiences involve the development of professional competencies in the development and maintenance of building sites.

Students may use the school grounds as a laboratory, however, the maintenance of school grounds must be secondary to instruction.

A suitable laboratory/shop must be provided for meaningful activity during periods of inclement weather.

Instructional Areas



1. Classroom
2. Office/Conference
3. Shop/Laboratory
4. Greenhouse
5. Land Laboratory
6. Lockers
7. Tool Room

Utility Requirements

Separate heating and ventilation control for the greenhouse.
Exhaust system for welders.
Exhaust system for small and large internal combustion engines.

Special Features

Fenced area for storage of supplies and equipment.
Large overhead door at least 10 feet wide x 10 feet high.
Land laboratory with areas developed for arboritum, nursery, turf plot and golf green.

Equipment

Steam cleaner.
Bench grinder.
Arc welder.
Oxy-acetylene welder.
Drill press.
Small tractor and mower.
Utility tractor and mower.
Roto tiller.
Power rake.
Soil sterilizer.
Concrete mixer.
Fertilizer proportioner.

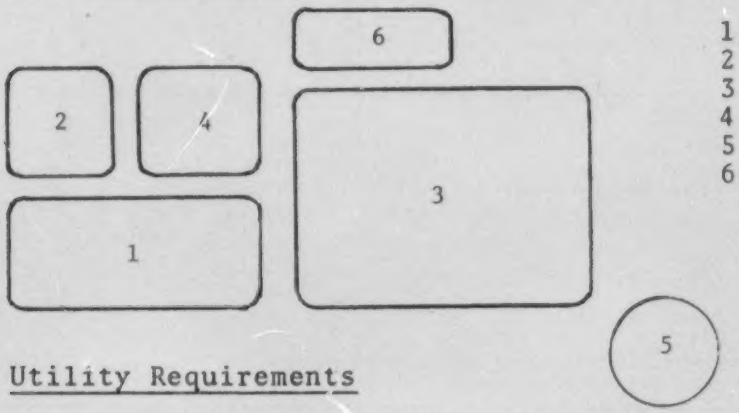
OE # 01.06 Natural Resources

Program Activities

Classroom and hands-on experience involves the development of competencies in Forestry, Wildlife Management, Soil and Water Management and Outdoor Recreation.

Meaningful activities should involve the professional techniques required for the management and use of natural resources.

Instructional Areas



1. Classroom
2. Office/Conference
3. Shop/Laboratory
4. Tool Room
5. Land Laboratory
6. Lockers

Utility Requirements

Compressed air for cleaning and painting.
Both 110v and 220v electrical outlets.
Exhaust system for welders.
Exhaust system for small and large internal combustion engines.

Special Features

Fenced area for the secure storage of large equipment and supplies.
Large overhead door at least 12 feet wide and 10 feet high.
Ceilings should be at least 15 feet high.
Overhead trolley for chain hoist.
A land laboratory is of prime importance. If possible it should include forest, pond, stream, meadow, swamp and recreational areas.

Equipment

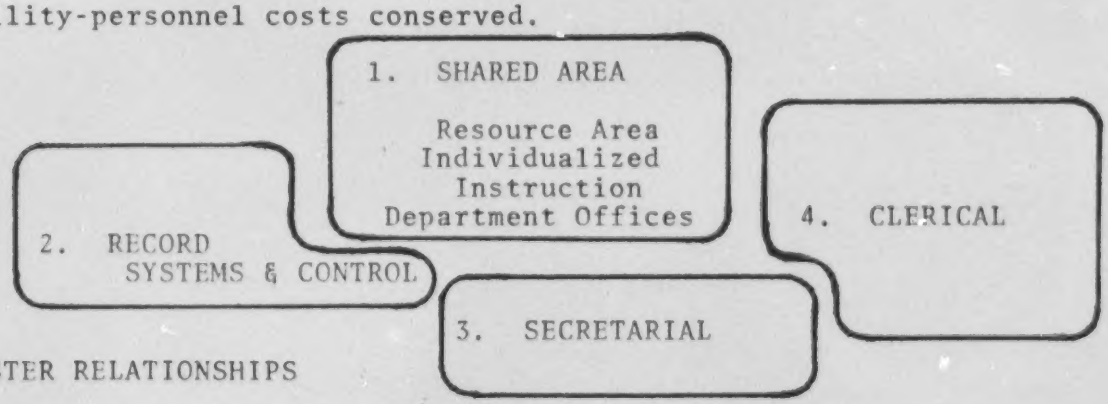
Steam cleaner.
Chain hoist.
Power hack saw.
Tilting arbor saw.
Drill press.
2 Arc welders.
1 Oxy-acetylene welder.
Bench grinder.
Small cleet track tractor with loader.

SCOPE

Business and Office Education is designed to provide interested students with the opportunity to acquire entry-level employment skills and assist in the acquisition of social and economic understanding necessary for successful assimilation into society. These dual objectives--Vocational and General Education--serve to meet the needs of the student and the community.

In meeting these objectives, vocational education is provided through occupational clusters. These include clerical occupations, secretarial occupations, and record systems and control occupations. The cluster organization reflects competencies common to related occupations. This cluster approach emphasizes vocational experiences relevant to the student's career objective and the development of attitudes that contribute to job success. Utilization of cooperative education and vocational student organizations further enriches and facilitates acquisition of relevant skills, knowledges and attitudes.

The following schematic shows commonalities and cluster relationships while suggesting how spaces can be shared and facility-personnel costs conserved.



CLUSTER RELATIONSHIPS

This guide proposes to consider and integrate a systems approach to program planning and development in determining facility requirements.

INSTRUCTIONAL AREAS

Dynamic developments in business and industry cause rapid changes in business procedures and technology. The selection of specific occupations within occupational clusters requires a background of information about realistic occupational opportunities and requirements as evidenced by advisory committee information and surveys of the employment community and student interest. The list of occupations provided serves merely as a guide in this selection process. While these may be appropriate, other occupations whether current or emerging should be considered if supported by current occupational evidence.

The selection of specific instructional areas will depend upon the occupations for which instruction is provided and the instructional methods that most efficiently and effectively prepare the student for entry-level job placement.

The instructional area may represent a room, group of rooms, or areas within a room or rooms. Decisions about room configurations including square footage required will be made through the planning process based upon the occupational program, projected student enrollment and methodology.

FACILITY DESIGN

General Considerations

Provision for environmental controls such as air conditioning, humidity and dust controls, specialized storage areas, a fire control system, and raised flooring to accommodate electrical cables may be necessary if an on-site computer is included in the facility. Some automatic typewriters and office machines also require environmental controls. The manufacturer of the selected equipment can best provide these specifications and requirements.

Incorporation of acoustical treatment of ceiling and/or walls or floors is recommended to reduce the noise level within the machines laboratories and present interference with adjacent facilities. This factor is especially important when designing an "open concept" facility and selecting certain equipment.

Provision for common and individual storage areas, work counters with built-in storage, filing cabinets and storage cabinets should be made within and conveniently adjacent to the labs. Storage areas should be designed to accommodate workbooks, supplies, intercom and telephone systems, audio-visual equipment, and instructional software.

Provision within the common resource area for individualized instruction and study, small group planning and instruction, and reference materials would need to be enlarged to accommodate individual student stations and equipment if this instructional mode is selected as the primary methodology.

Provision should be made to include wash-up facilities in the duplicating and/or reprographics area. Specialized machines such as keypunch, data recorders could also be included in a combination duplicating-machines area.

Provision for beginning typewriting instruction should be made in a separate lab. This provides flexibility in the efficient and economical scheduling of the fully equipped lab.

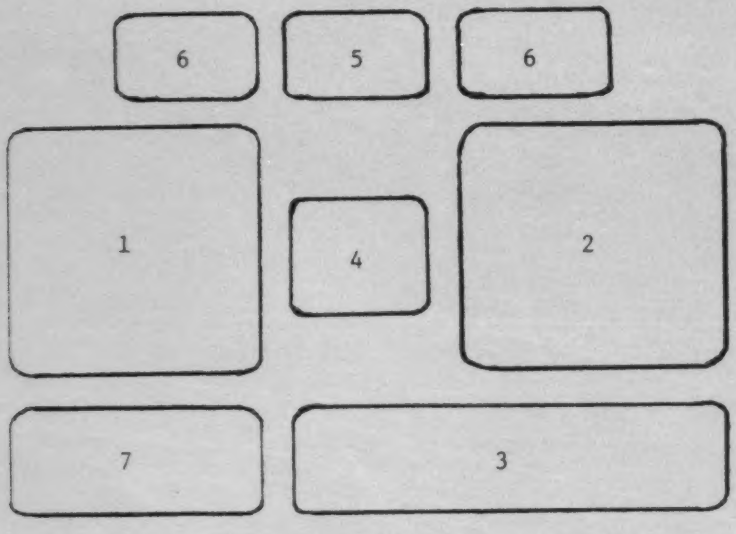
Selection of an electrical system that is flexible, safe and convenient should include a master control switch (power cut-off switch).

Provision for an office area for the Cooperative Office Education Coordinator and Department Chairperson could be made either as a separate facility or as part of an instructional area. The office area should be glass enclosed to assure audio privacy if included within the instructional area.

CLERICAL OCCUPATIONS CLUSTER

OE # 14.03

CLERICAL OCCUPATIONS	INSTRUCTIONAL AREAS	INSTRUCTIONAL METHODS
Clerk-Typist	Office Machines	Individual
Receptionist	Reprographics	Group
General Office Clerks	Filing and Recordkeeping	Simulated
File Clerks	Basic Business	Cooperative Office Education
Office Machines Operators	Office Procedures	Vocational Student Organizations
Mail Clerks	Typewriting	
Statistical Clerks	Simulated Office Machine Transcription	
Keypunch Operator		
Data Recorder		
Communications Systems Clerks		



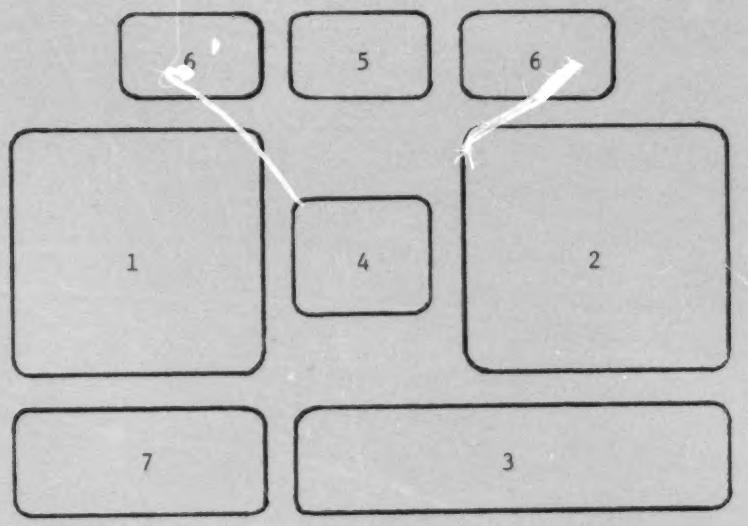
*1. Simulated Office
2. Clerical Skills Lab
3. Beginning Typewriting
4. Duplicating/Reprographics Area
5. Resource Area
6. Storage
7. Basic Business

*Square footage requirements depend upon occupations selected, instructional areas utilized, instructional methods preferred, and the number of students served. Instructional areas in the secretarial and clerical occupations clusters can be combined depending upon the number of students to be served.

Contact the General-Clerical Cluster Specialist at the New Jersey State Department of Education, Vocational Division, for further information and assistance.

SECRETARIAL OCCUPATIONS CLUSTER

OE # 14.07	SECRETARIAL OCCUPATIONS	INSTRUCTIONAL AREAS	INSTRUCTIONAL METHODS
	Secretary Stenographer (Manual or Machine) Executive Secretary Medical Secretary Legal Secretary Administrative Assistant Management Trainee Administrative Secretary Correspondence Secretary	Dictation and Transcription Machine Transcription Basic Business Office Procedures Typewriting Shorthand Reprographics Office Machines Simulated Office Filing and Recordkeeping Machine Stenography	Individualized Group Simulated Cooperative Office Education Vocational Student Organization



*1. Simulated Office
2. Clerical Skills Lab
3. Beginning Typewriting
4. Duplicating/Reprographics Area
5. Resource Area
6. Storage
7. Basic Business

*Square footage requirements depend upon occupations selected, instructional areas utilized, instructional methods preferred, and the number of students served. Instructional areas in the secretarial and clerical occupations clusters can be combined depending upon the number of students to be served.

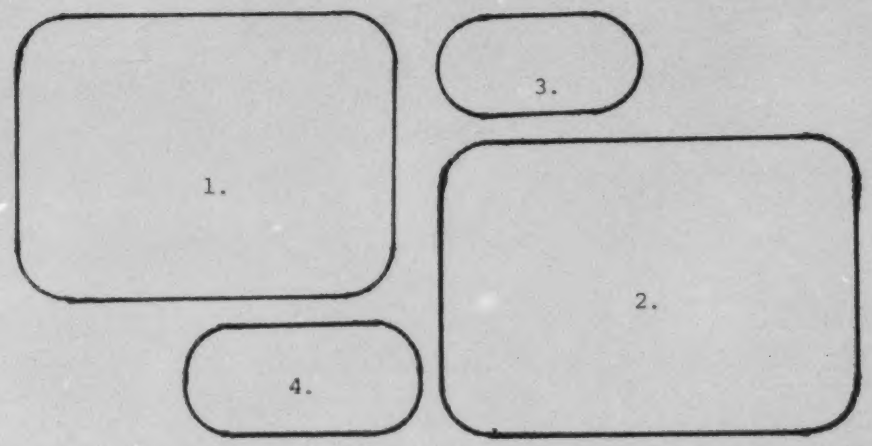
Contact the General-Clerical Cluster Specialist at the New Jersey State Department of Education, Vocational Division, for further information and assistance.

RECORD SYSTEMS AND CONTROL OCCUPATIONS CLUSTER

OE # 14.01 BOOKKEEPING-ACCOUNTING OCCUPATIONS	INSTRUCTIONAL AREAS	INSTRUCTIONAL METHODS
Accounts Receivable Clerk	Bookkeeping, Accounting and Records Management	Individual
Accounts Payable Clerk	Data Processing and Programming	Group
Payroll Clerk	Office Machines	Simulated
Inventory Clerk		Cooperative Office Education
Billing Clerk		Vocational Student Organizations
Bank Teller		
Cashier		
Bookkeeper Trainee		

OE# 14.02 DATA PROCESSING OCCUPATIONS

Programmer Trainee
Computer Operator
Tape Librarian
Key Entry Operator



*1. Computer Area
2. Bookkeeping-Accounting Lab
3. Resource Area
4. Storage

*Square footage requirements depend upon occupations selected, instructional areas utilized, instructional methods preferred, and the number of students served.

Contact the Bookkeeping-Accounting Cluster Specialist at the New Jersey State Department of Education, Vocational Division, for further information and assistance.

EQUIPMENT SELECTION

Equipment selection is an important consideration in maximizing the effectiveness of instruction. Laboratory experiences should be designed using standard equipment representative of that used in business and industry. Equipment should be selected which contributes to an instructional environment that simulates business and industrial practices. This is of particular importance in the selection of costly data processing and word processing equipment that tends toward obsolescence after only a few years use.

To minimize this cost factor, many manufacturers now offer an educational discount lease or rental plan. The rate of obsolescence is a major factor in the decision to lease or purchase costly equipment.

The following equipment list should be used as a guide to current equipment commonly found in business and industry. Selection of specific equipment will depend on the occupations for which training is provided.

EQUIPMENT

Calculating

- 10 Key Adding/Listing Machines
- Electronic Display Calculators
- Electronic Printing Calculators
- Electronic Programmable Calculators

Duplicating

- Fluid Duplicator
- Stencil Duplicator
- Electronic Stencil Scanner/Cutter
- Offset Press
- Electrostatic Copier
- Thermal Copier

Typewriting

- Electric Typewriters
- Manual Typewriters
- Single Element Typewriters
- Correcting Typewriters
- Proportional Spacing Typewriters
- Automatic Typewriters
- Magnetic Keyboard Typewriters
- Composer

Data Processing

- Computer Terminals
- Central Processing Unit
- Card I/O Unit
- Secondary Storage Units
- Printer
- Keypunch
- Data Recorder
- Sorter
- Verifier
- Interpreter

Other

- Dictation Machines
- Transcription Machines
- Dictation-Transcription Machines
- Collator
- Folding Machine
- Switchboard
- Telephone-Intercom System
- Music System
- Time Clock
- Shorthand Laboratory Components
- Machine Shorthand Equipment

AV Equipment

- Cassette Players
- Overhead Projectors
- Tape Recorders
- Filmstrip Projector
- Slide Projector
- Single-Concept Film Projector
- Video-Tape Recording Components

Furniture

- Secretarial Desks
- Secretarial Chairs
- "L" Shaped Desks
- Student Posture Chairs
- Student Desks
- Student Chairs
- "Wet" Carrels
- "Dry" Carrels
- Vertical Files
- Lateral Files
- Storage Cabinets
- Counters with Built-in Storage
- Work Tables
- Office Partitions
- Carpeting
- Draperies

SCOPE

Distributive Education is a one to three year program in high schools, vocational schools, and junior colleges designed to provide instruction and experience in retailing and the other distributive occupations. There is a great deal of emphasis on teaching basic skills and providing adequate experience in the performance of the many routine tasks that are essential parts of any retail, marketing, or service center.

The major program objective in Distributive Education is to assist learners in acquiring a broad diversity of essential knowledge and necessary skills by experience and experimenting with the equipment and supplies actually being used, in the widest possible range of distributive occupations.

Most of the programs attempt to develop positive attitudes in the students toward their jobs, the customers, and the free enterprise business system in general.

The most effective Distributive Education programs are those that provide a wide variety of the experiences that are required to qualify the students for entry level jobs. Fundamentally, Distributive Education is not a textbook course, so the students are encouraged to get physically involved. They are encouraged to discover their own most suitable areas of interest and ability from such possibilities as display, advertising, sales, merchandising, planning, or control. From there it's "hands-on" all the way. Opportunities are provided to develop skills in their chosen careers to their utmost capabilities.

INSTRUCTIONAL AREAS

In order for the students to be involved in the many diverse activities and experiences that are an integral part of this curriculum, there must be suitable space, equipment and supplies available to conduct a fully worthwhile and effective program.

A classroom equipped with a sales laboratory (part of which may serve also as the school store) and display window will require more space than the general classroom facility. The room should be large enough to accommodate movable tables and chairs, in addition to space allotted for the sales laboratory unit and display window. Storage area and closets should be available for related props, supplies and equipment. The room should be exposed to the maximum flow of student traffic. A sink should be provided. Numerous electrical outlets are required. Carpeting is desirable. Detailed specifications can be furnished on request.

Sufficient space will be needed for filing all types of leaflets, pamphlets, magazines, brochures, books, bulletin materials and current trade publications (several of which are daily issues).

Store fixtures, equipment and supplies should be designed for flexibility, adaptability and convertibility, i.e. all shelves, hangrods and other accessories should be fully interchangeable between all merchandising fixtures. Merchandise counters should be adaptable for independent free standing use as well as able to be used in conjunction with wall units and gondolas. Slotted uprights, (for holding shelves and a wide variety of accessory brackets), should have "universal slotting," (spaced on one inch centers), which assures the widest possible use of accessories, etc., from various manufacturers.

OCCUPATION CLUSTERS

Distributive Education includes various combinations of subject matter and learning experiences related to the performance of activities that direct the flow of goods and services, including their appropriate utilization, from the producer to the consumer or user. These activities include selling, and such sales-supporting functions as buying, transporting, storing, promoting, financing, marketing research and management.

OE #	OCCUPATION
04.01 00	Advertising Services
04.02 00	Apparel and Accessories
04.03 00	Automotive
04.04 00	Finance and Credit
04.05 00	Floristry
04.06 00	Food Distribution
04.07 00	Food Services
04.08 00	General Merchandise
04.09 00	Hardware, Building Materials, Farm and Garden Supplies and Equipment
04.10 00	Home Furnishings
04.11 00	Hotel and Lodging
04.12 00	Industrial Marketing
04.13 00	Insurance
04.14 00	International Trade
04.15 00	Personal Services
04.16 00	Petroleum
04.17 00	Real Estate
04.18 00	Recreation and Tourism
04.19 00	Transportation
04.20 00	Retail Trade, Other
04.31 00	Wholesale Trade, Other
04.99 00	Distributive Education, Other

The entire area should be contiguous space.

- A single open area usually provides the opportunity for the most suitable layout.
- A double classroom divided by a folding door usually works well with little remodeling costs necessary.
- Adjoining classrooms can be used if access between the two is possible and visual control from one to the other can be achieved.

There must be separate entrances from the corridor into the classroom area and into the sales training laboratory (school store) as well as an entrance between the two.

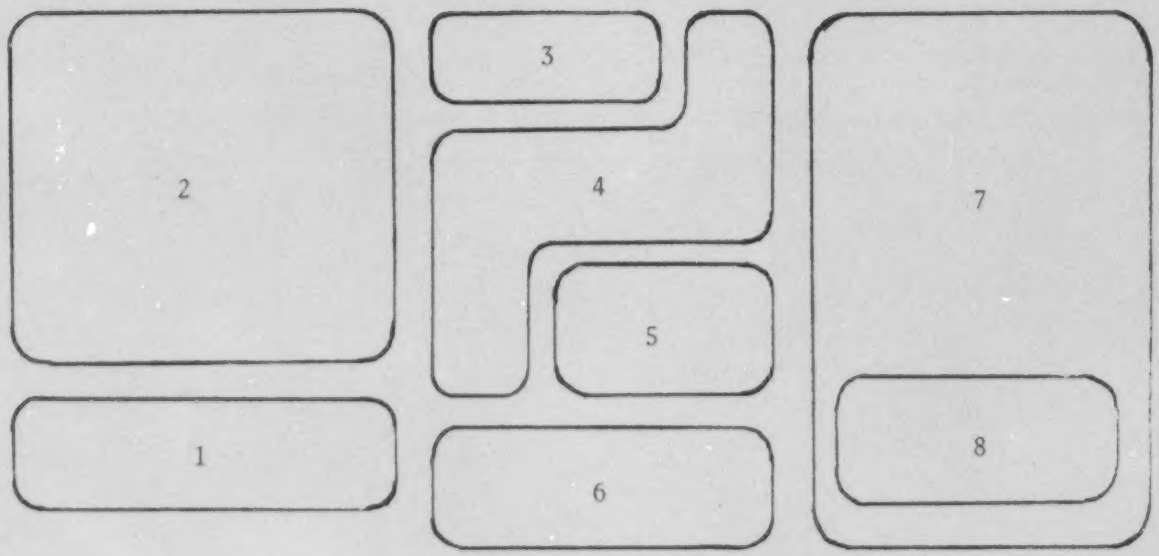
The office should be located so that visual and physical control of the classroom laboratory are readily achieved.

One storage area must be reserved for the exclusive use of the school store to be separated from the general storage area used by students in classroom project work activities.

A simulated fashion display window, facing the corridor from the classroom area of the facility is preferred. If this is not possible, a free-standing, self-contained, simulated display window can be substituted. This unit would be more suitably and effectively located in a lobby area or in a wide corridor rather than in the classroom area.

It is best to locate the facility in proximity to maximum traffic flow, but may be considered of secondary importance in relation to the above-mentioned priority needs.

AREA RELATIONSHIPS



*1.	Display	5.	Office
2.	Lecture area	6.	Storage
3.	Practice check out area	7.	School Store
4.	Library and Recordkeeping	8.	Reserve stock storage

*Square footage requirements depend upon occupations selected, instructional areas utilized, instructional methods preferred, and the number of students served. Instructional areas can be combined depending upon the number of students to be served.

Contact the Director, Distributive Education in the New Jersey State Department of Education, Vocational Division, for further information and assistance.

EQUIPMENT SELECTION

The student activity in a Distributive Education class is on an individual project or small group basis. The student has a dual responsibility: classroom achievement and "on-the-job" progress.

The educational and training experiences for students develop judgment, skills and attitudes needed for career opportunities in the distribution occupations. A Distributive Education program provides an environment for experimentation and an opportunity to learn distribution principles and concepts.

It is absolutely essential that the lab equipment (store fixtures) be as completely convertible and adaptable to properly display many different items which are of varying sizes, shapes and types of packages. Some items will be dropped, more added, some will require more space, some less. Item locations will have to be changed. All these problems will provide excellent learning experiences if the fixtures are adequately designed to be as flexible as current and changing conditions require.

BASIC EQUIPMENT

Wall unit with adjustable height hangrods
Wall unit with shelves
Gondola one side complete with shelves
Open front merchandiser
Simulated fashion display window
Low bases
Student book cubicle unit
Project work counter
Impulse merchandising back bar
Student desks--24" x 48"
Steel shelving storage units
Dupli-fi. table
Four drawer file cabinet
Double opening project work carrel
Back to back project work carrel
Wall merchandiser
Floor merchandiser

Merchandising counter
Security wall case
Full vision showcase
Half vision showcase
Trophy wall case
Wrap counter
Register stand
Stack chairs
Shadow box displayer
Magazine and literature rack
Mobile pegboard back wall merchandiser
Mannequins, fiberglass, flexible waist, knees, elbows, and stand
Dress form with jersey torso with stand
Self-standing plastic body and torso form
Counter top and window display tops-assorted styles w/stand
Chrome display pedestals - felt ends
Chrome rod display stands - U shaped
Plexiglass display shelves
Assorted size frame sign holders and stands
17" DI turntable - electric
2 tier superstructure for turntable
Ceiling turner with rotating electrical outlet
Ball spot lights - adjustable position
Assorted display stands, easels, card holder, pins and windows trimming aids and accessories - kit
Spray sign kit with cardboard cabinet and divided drawers
Special spray sign brush and slimline letters
Sales register
Long carriage typewriter
Adding machine
Detection mirror - 24" DIA - shatter proof
Microwave - electronic security guard unit
Duplicating equipment - mimeo, etc.
Audio Visual - 35 mm projector, 16 mm projector, tape cassette with sound

All equipment should be designed to meet the highest standards of safety and to have the ability to stand hard student use, i.e. all glass shelves, glass sliding doors, showcases and display cases should have "heat treated," tempered, safety glass; each shelf should have three support brackets within every 4' span; pegboard, where used, should be 1/4" American-made tempered masonite with 1/4" holes on 1" centers; 3/4" plywood or novaply should be used throughout on tops, decks, sides, backs of all merchandising units. All projecting edges of merchandising units should be protected by full wrap-around metal cap moulding; recessed kick bases should be covered with a good grade linoleum; all exposed surfaces should be covered with formica (or other equal gauge high pressure laminate) or at least 3 coats of sprayed-on lacquer finish paint.

SCOPE

Health Occupations education programs encompass those career areas which provide services to individuals in need of health care. They include direct patient care and supportive services. Employment in this discipline is available in a wide variety of settings: health care facilities (hospitals, nursing homes, and extended care facilities), community health service agencies, and professional offices.

Educational administrators need to consider the following factors when determining the kind of program to be offered: student needs, community needs, and employer needs.

1. Student Needs - opportunities to enroll in programs which develop concepts and related skills to prepare for a career in health. This preparation must be realistic to the student's abilities, interests, job opportunities, career mobility, continued education, and advancement possibilities.

2. Community Needs - competent health workers to assist in providing quality health care for its citizens.

3. Employer Needs - health occupations programs that prepare individuals to be competent employees.

Local community and regional health care institutions must be surveyed to make sure that the programs considered are compatible with the needs of all the groups listed above.

Vocational health occupations education programs are organized around the following patterns:

Single Occupation
Cluster of Related Occupations
Sequential Programs

An essential part of each pattern includes planned, supervised experience in local health care facilities as part of the educational program. This experience is supervised by the school instructor to insure that the experiences are educationally oriented.

Preparation for entry into a specific single occupation may range from short-term educational programs to those leading to an associate degree in county or community colleges. Some programs may lead to certification and/or licensure. The program for high school students may range from two consecutive class periods per day to one half of the school day.

A comparatively new approach, is the clustering of related occupations. It is structured to present core knowledge and skills common to several health occupations. Upon completion of the "core", students continue their preparation in that single occupation for which they have shown interest and aptitude.

The sequential program begins in the ninth grade with a general exploratory program to acquaint students with the wide variety of opportunities in this field. During the tenth grade, foundation courses are coupled with exposure to health care facilities on an observational basis. In grade eleven, students enroll in a program to prepare them for one health occupation or cluster of related occupations. The senior year is designed as a cooperative education program. Adaptations of this sequence may be selected to meet the specific needs of the students as well as the school and the community. The goal is to prepare the student for a saleable skill upon graduation.

SUGGESTED CLUSTER PROGRAMS

Patient Care Occupations

Practical Nursing
Nursing Assistant

Rehabilitative Occupations

Physical Therapy Aide
Occupational Therapy Aide
Recreational Therapy Aide

Dental Occupations

Dental Assistant
Dental Receptionist
Dental Laboratory Technician

Medical Laboratory Occupations

Medical Laboratory Assistant
Medical Laboratory Aide

Medical/Clerical Occupations

Medical Office Assistant
Medical Receptionist
Unit Clerk/Admitting Office Personnel
Medicals Record Clerk

Diversified Health Occupations

Central Supply Personnel
Surgical Technician
EKG/EEG Technician

Guidelines for the more prevalent health occupations education facilities follow. The Director, Health Occupations Education in the Division of Vocational Education, State Department of Education should be contacted for further information and assistance in program planning.

GENERAL CONSIDERATIONS

Provision of space and equipment that will create, as much as possible, the atmosphere of the appropriate health care agency for which the training will be conducted.

Provision for a supply of hot and cold water with adequate sink facilities is essential for all classrooms where health occupations education programs are to be conducted. Storage cabinets and work counters with built in storage are necessary. Adequate 110V electrical outlets should be conveniently located around the room.

Location of the classroom needs to be away from disturbing noises, visitors, and student traffic.

Equipment layout should allow for flexibility and assure privacy in health occupations practice areas.

Arrangement of space requires the following units:

Lecture - Demonstration Area - This includes a teaching station, student seating area, storage for models and other instructional media, and reference library.

Laboratory Area - This serves as an area to provide student practice in skill development.

Student Areas - This includes locker and lavatory and dressing areas adjacent to or connecting with the laboratory area.

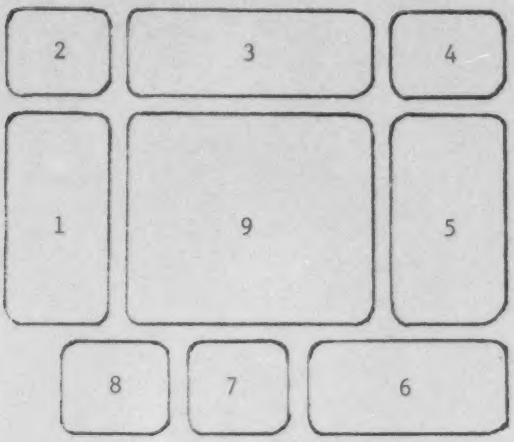
Storage Areas - This area will house large pieces of equipment. Shelving should be provided for storage of linen and other supplies. This area should open into the laboratory area.

Faculty Areas - This includes teacher offices and conference room with appropriate furniture and equipment.

OE # 07.03 PATIENT CARE OCCUPATIONS

The patient care occupations area provides opportunities to develop practical nursing or nursing assistant/orderly skills. These students are prepared to provide personal care to patients in hospitals, nursing homes, and other health care facilities.

Instruction Area



Laboratory Area

1. Beds and Bedside Unit
2. Storage Area
3. Work counter
4. Utility room
5. Bed and Bedside Units

Classroom Area

6. Lockers and Lavatory Facilities
7. Storage
8. Teacher's Office
9. Instruction
   a. Group
   b. Individual
   c. Reference

Utility Requirements

Hot and cold running water with deep sink, 110 volt electrical outlets should be available at each patient care unit and additional outlets dispersed throughout the laboratory and classroom area. An air conditioning unit is essential if instruction is held during the summer months. Adequate lighting, work counter with built-in cabinets, a sink and wall cabinet are essential.

Special Features

Ceiling tracks are necessary for curtains to surround each patient care unit. Cabinets with locks are necessary to store needles and syringes. A minimum of one patient care unit is needed for four students. One unit includes: hospital bed, overbed table, bedside cabinet, footstool and bedside chair.

Equipment

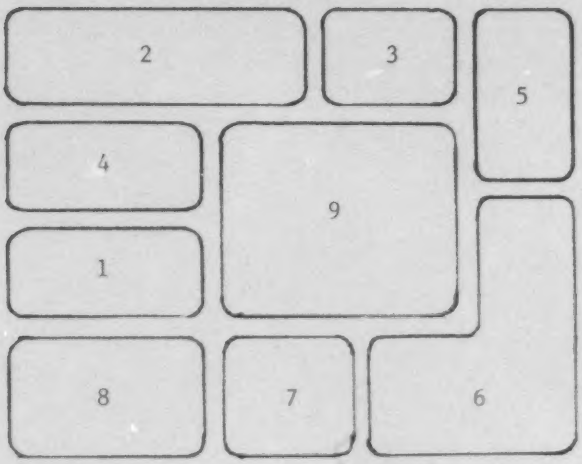
Beds with side rails and plastic covered mattresses, overbed tables, bedside cabinets, foot stools, wheel chair, stretcher, medicine cabinet, utility cart, scale, crib, infant scale, laundry hampers, refrigerator, small stove, and autoclave.

OE # 07.01 DENTAL OCCUPATIONS

Program Activities

The area designed and furnished for dental occupations education can be utilized to provide instruction for the dental assistant, dental receptionist, or dental laboratory technician programs. The instruction area is designed to provide for skill development in chairside assisting, certain laboratory procedures, and office duties.

Instruction Area



I. Laboratory Area

1. Utility Area
2. Work Area
3. Storage Area
4. Dental Units
5. Dental Office Area

II. Classroom Area

6. Lockers - Lavatory
7. Storage
8. Teacher's Office
9. Instruction Area
   a. Individual
   b. Group
   c. Reference

Utility Requirements

Gas and air outlets needed in laboratory work area. Include hot and cold running water in laboratory and x-ray developing areas. 110 volt electrical outlets should be available in laboratory area as well as conveniently located throughout classroom area. Adequate lighting is essential. Work counters with built in cabinets and sink, and wall cabinets are essential.

Special Features

A dark room with developing tank and temperature controlled water is needed. Before operating x-ray equipment, approval must be granted by the Radiation Protection Agency located at the New Jersey Department of Health. Consult manufacturer regarding space and utility needs. In the laboratory area, space should be provided for individual work units and a demonstration table. The office area should be designed to resemble a professional office.

Equipment

Dental chairs and units, operating lights, operating stools, autoclave, cabinets, x-ray machines, x-ray developing tank, vibrator, amalgamator, x-ray view box, and x-ray timer. Receptionist area should include desk, chair, filing cabinets, telephone and typing table with typewriter.

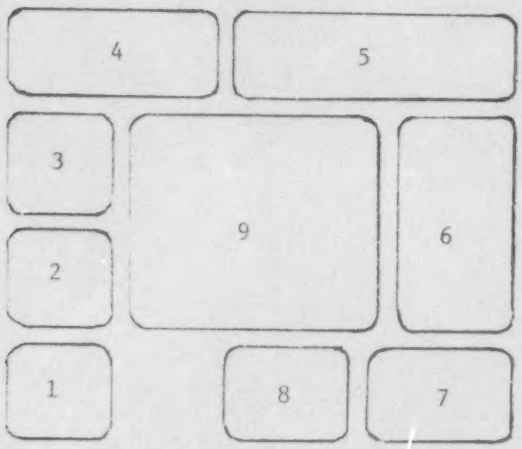
OE # 07.03 MEDICAL OFFICE CAREERS

Program of Activities

The area of instruction for Medical Office Careers combines business office occupations and health occupations skills. These skills prepare students for health careers in community health services agencies, health care facilities, and professional offices.

An area equipped for Medical Office Careers can serve the interests and needs of students for a variety of health careers. The medical assistant can be prepared to assist a physician in the examination and treatment of patients in a medical office or a clinic, as well as perform reception and clerical duties. Other occupations that involve medical office skills are the medical records clerk, the unit clerk, and the hospital admissions clerk.

Instruction Area



Laboratory Area

1. Storage
2. Utility Room
3. Medicine Room
4. Examining Room
5. Medical Office Area

Classroom Area

6. Lockers and Lavatory facilities
7. Storage
8. Teacher's Office
9. Instruction Area
   a. Group
   b. Individual
   c. Reference

Utility Requirements

Hot and cold running water with sink in the utility and laboratory area is essential. Electrical outlets conveniently located throughout the laboratory and classroom area, adequate lighting, wall cabinets, work counter with built in cabinets are necessary.

Special Features

Movable partitions are necessary between examining tables so as to provide an area that resembles a professional office as well as insure privacy. The office area should also be arranged to resemble the professional office.

Equipment

Examining tables and movable partition, medicine cabinet, utility carts, wheel chair, foot stool, refrigerator, electrocardiograph machine, scale, dictaphone, telephone unit, typewriters, typing tables, desks, bookcases, filing cabinets, and autoclave.

OE # 07.01 07.03
07.02 07.04.01
07.04.02

DIVERSIFIED HEALTH OCCUPATIONS

Program Activities

Diversified Health Occupations Education Programs provide basic knowledge and skills for the surgical technician, the central supply personnel, and the EKG/EEG technicians. The skills of these careers require considerable instruction in clinical areas since it would not be practical for schools to purchase the necessary equipment. Physical Therapy, Occupational Therapy, and Recreational Therapy Assistants can utilize this area for basic skills, but the rehabilitation occupations also require clinical agencies to further develop skills. This instruction area can be further utilized to provide various Health Occupations Clusters, such as Medical and Dental Office Careers, as well as Patient Care Careers.

Instruction Area

Laboratory Area

1. Beds and Bedside Units
2. Storage
3. Work Area
4. Utility room
5. Examining Room
6. Receptionist Area
7. Dental Unit Area

Classroom Area

8. Lockers and Laboratory facilities
9. Storage
10. Teacher's Office
11. Instruction Area
    a. Group
    b. Individual
    c. Reference

Utility Requirements

Hot and cold running water with sink, 110 volt electrical outlets throughout the laboratory and classroom area are required. A work counter with built-in cabinets and sink, wall cabinets are needed.

Special Features

Movable partitions are necessary to separate the varied areas of instruction. Examining rooms and office areas should be designed to resemble a professional office.

Equipment

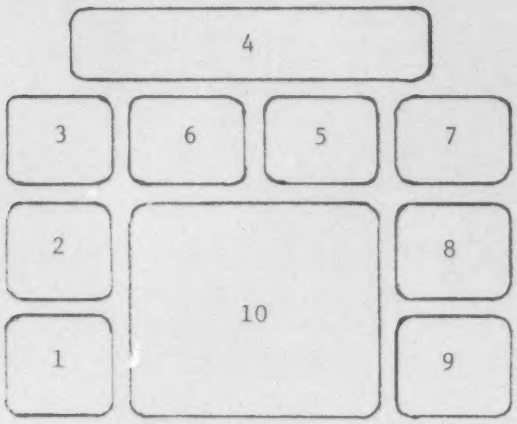
Beds, bedside cabinets, overbed tables, bedside chairs, footstool, stretcher, crutches, walker, electrocardiograph machine, scale, baby scale, crib, medicine cabinet, utility cart, dental unit, examining table, typewriter, desk, telephone, dictophone, filing cabinet, refrigerator, and autoclave.

OE # 07.03 MEDICAL LABORATORY OCCUPATIONS

Program of Activities

The area for the Medical Laboratory Occupations Education Program is designed to prepare the laboratory assistant with basic skills required to work in a Medical Laboratory. It further provides for instruction of more advanced skills needed by the medical technologist.

Instruction Area



Laboratory Area

1. Storage Area
2. Utility room
3. Individual student wo area
4. Work area
5. Individual Student Wo Area
6. Central Work Area

Classroom Area

7. Lockers and lavatory
8. Storage Area
9. Teacher's office
10. Instruction Area
    a. Group
    b. Reference

Utility Requirements

Electric and gas outlets, fire fighting equipment, adequate lighting, hot and cold running water with sink are essential. Work counter with built-in cabinets, wall cabinets are needed.

Special Features

Individual student units which include work space, gas, water, and electrical outlets are necessary. A fume hood is necessary in the laboratory area. There should be one sink per 10 students.

Equipment

Analytical balance, autoclave, automatic pipette washers, barometer, centrifuge, chemistry hood, distilling apparatus, electrocardiograph machine, incubator, interval timer, microscopes, refrigerator, spectrophotometer, triple beam balance, utility oven, and view box.

SCOPE

The program of study in Home Economics Education includes two components: 1) preparation for family, home and community life, and 2) preparation for future employment.

Curriculum offerings are designed to meet the varied needs, interests, and abilities for all segments of the population. Since a majority of contemporary men and women assume a dual role of homemaking and wage earning, it is a necessity that the population be offered help in making decisions to meet their physical, psychological, and social needs. Therefore, the learning experiences provided through Consumer and Homemaking courses contribute to the improvement of home environments and the quality of life.

Comprehensive Consumer and Homemaking programs for pre-school children through adults include the following areas of study:

- Child Development and Guidance
- Clothing and Textiles
- Consumer Education
- Family Health and Safety
- Family Living and Parenthood Education
- Foods and Nutrition
- Home Management
- Housing, Home Furnishings and Equipment
- Personal and Family Economics

Occupational courses make it possible for students, who will terminate their education upon graduation from high school, to acquire necessary knowledge, skills, and experience for immediate employment. They also serve students who wish to prepare for semi-professional careers and professional careers in Home Economics and who wish to continue their education in a two or four year post high school program in home economics technologies or professional careers.

Occupational Home Economics Courses are available in the following areas:

- Child Care, Guidance, and Teaching
- Clothing, Apparel, and Textile Industry
- Family and Community Services
- Food Service Industry
- Housing Design and Interior Decoration
- Institutional Household Maintenance Services

Occupational Home Economics learnings may be acquired in an in-school laboratory in any of the occupational areas listed above or by enrollment in a Home Economics Cooperative Education program which uses the community as an extended laboratory.

INSTRUCTIONAL AREAS

Since Home Economics encompasses Consumer and Homemaking courses and Home Economics Related Occupations, it is necessary to provide adequate facilities if the program is to be functional. Facilities may be planned as a Consumer and Homemaking Center with basic areas/laboratories/classrooms and/or specific occupational laboratories.

The instructional area should reflect the type of curriculum which has been developed according to an assessment of needs, concerns and interests of the population being served by the program. Consumer and Homemaking Education Curriculum may be developed to serve pre-school children, elementary, secondary pupils and adult while the Home Economics Related Occupational Curriculum serves the high school, post-secondary and adult populations.

Methods of instruction to be used in each area of study also provide direction for designing the instructional area. Instructional methods which may be used in Consumer and Homemaking and/or Home Economics Related Occupations courses are:

- Individualized
- Group
  - Small
  - Medium
  - Large
- Discussion
- Lecture
- Laboratory Experience
- Demonstration
- Team Teaching
- Simulated
- Cooperative Home Economics
- Vocational Student Organization

The following guides provide information concerning the Consumer and Homemaking and Home Economics Related Occupations clusters. These guides may be used for developing the curriculum which will provide additional directions in designing the instructional areas.

Clusters for Home Economics

OE # 09.01 Consumer and Homemaking Education

09.01 01 Comprehensive Homemaking or Home Economics
09.01 02 Child Development
09.01 03 Clothing and Textiles
09.01 04 Consumer Education
09.01 05 Family Health
09.01 06 Family Relations
09.01 07 Foods and Nutrition
09.01 08 Home Management
09.01 09 Housing and Home Furnishings
09.01 99 Homemaking, Other

I. Dual Role Homemaking
Inter-changeable
Technician for Homemaking

A. Personal-Family Relationships

1. Assessment of Individual and Family Needs
2. Identifying Individual and Family Goals, Values, and Standards
3. Developing Relationship and Problem Solving Skills
4. Nurturing of Family Members
5. Communication

B. Home Management

1. Identifying Family Goals, Values, and Standards
2. Decision Making
3. Identifying and Planning of Household Tasks
4. Developing Homemaking Skills
5. Organizing, Implementing, and Adjusting Plan of Operation
6. Evaluating Results from Operations

C. Consumerism

1. Assessment of Needs
2. Comparative Analysis of Products
3. Decision Making and Utilization of Resources
4. Purchasing
5. Utilization of Product
6. Evaluation of Product

OE # 09.02 Home Economics Related Occupations

Code	Area
09.02 01	Care and Guidance of Children
09.02 02	Clothing Management, Production and Services
09.02 03	Food Management, Production and Services
09.02 04	Home Furnishings, Equipment and Services
09.02 05	Institutional and Home Management and Supporting Services
09.02 99	Occupational Preparation, other

II. Child Care, Guidance and Teaching

A. Family Child Care Homes

1. Nurturing of Individual Child
2. Caring for Physical Needs of Child
3. Protecting the Child
4. Guiding and Teaching Child
5. Compliance with Regulations
6. Adjusting Household to Meeting Needs of Child

B. Institutional Child Care Services

1. Providing Physical Care of Children
2. Nurturing and Guidance of Children
3. Planning and Adapting Programs to Children with Varying Needs
4. Teaching of Children
5. Supervision of Children

C. Community Child Care and Guidance Services

1. Caring for Physical Needs of Children
2. Planning and Scheduling for Children's Activities
3. Directing Children's Activities
4. Supervision of Children
5. Guiding and Nurturing of Children
6. Housekeeping and Maintenance
7. Operating, Management, and Supervision

III. Clothing, Apparel, and Textile Industry

A. Production and Management

1. Spinning Yarn
2. Weaving Fabric
3. Cutting Garment
4. Marketing and Assembling
5. Serving and Stitching
6. Trimming and Finishing
7. Pressing
8. Inspecting and Checking

B. Design

1. Creating and Designing Garments
2. Patternmaking
3. Grading Pattern

C. Clothing Alteration and Maintenance

1. Laundering
2. Dry Cleaning
3. Repairing
4. Alteration

D. Product Development

1. Developing New Design or Product
2. Experimental Testing
3. Evaluation
4. Demonstrating Design or Product

IV. Family and Community Services

A. Social Welfare

1. Assisting Welfare Agency
2. Family Planning Counseling
3. Consumer Counseling
4. Assisting the Aging

B. Public Housing

1. Home Management and Family Counseling
2. Housekeeping and Household Maintenance
3. Consumer Counseling

V. Food Service Industry

A. Production and Management

1. Menu Planning and Controlling Cost
2. Food Purchasing
3. Food Storage and Inventory
4. Quantity Food Preparation
5. Equipment Care and Maintenance
6. Safety Maintenance
7. Cleaning and Sanitation
8. Controlling Quality

B. Service and Delivery

1. Maintenance and Food Quality
2. Counter Attending
3. Setting Up Tables
4. Serving Food
5. Packaging Food
6. Delivery of Food

C. Testing and Product Development

1. Developing Recipes
2. Experimental Testing of Food
3. Evaluating Food Product
4. Food Demonstration

D. Nutrition

1. Analysis of Dietary Needs
2. Menu Planning in Relation to Dietary Needs
3. Counseling re Nutritional Needs
4. Teaching Nutrition

VI. Housing Design, Interior Decoration

A. Design and Decoration

1. House Designing and Planning
2. Interior Decorating
3. Counseling on House Design and Decoration

B. Furnishings Selectivity

1. Selection of Paints and Finishes
2. Selection and Construction of Draperies, Slipcovers
3. Selecting and Combining Home Accessories
4. Selection of Household Equipment

C. Refurbishing and Refinishing

1. Upholstering
2. Refinishing Furniture
3. Caning
4. Repairing Furniture

D. Product Testing

1. Serviceability Testing of Furnishings
2. Comparative Testing of Household Equipment
3. Counseling on Home Furnishings and Equipment
4. Demonstration on Home Furnishings and Equipment

VII. Institutional Household Maintenance Services

A. Household Maintenance

1. Floors, Walls, Window Maintenance
2. Maintenance and Care of Furnishings and Household Equipment
3. Selecting Equipment and Supplies

B. Institutional Maintenance

1. Floor and Wall Maintenance
2. Window Maintenance
3. Furnishings and Equipment Maintenance
4. Checking and Inspecting

C. Product Testing

1. Analysis of Market for Cleaning Supplies and Equipment
2. Comparative Testing
3. Evaluation of Results
4. Communicating Recommendations

FACILITY DESIGN

There are basic principles to be considered in planning and designing a Consumer and Homemaking Center and/or Home Economics Related Occupational Laboratories.

These basic principles include:

1. The total Home Economics program is the basis for planning facilities.
2. The Center should be planned to accommodate any changes in the educational program.
3. The Center should be planned as a flexible facility which provides convertible, expansible, malleable and versatile space.
4. Teaching stations are planned for ease in supervision.
5. A first floor location near an outside entrance is preferable.
6. The facilities should be planned for the use of the total population.
7. Classrooms/laboratories and work areas should be near one another for convenience of planning and producing teaching materials.
8. Safety and health features should be incorporated.
9. Flexibility of space may be provided through mobile versus permanently installed equipment and storage.
10. There is ease of maintenance relative to room construction, equipment and furnishings.
11. Movable partitions or folding doors instead of walls between areas provide flexibility of the total department/center.
12. Decor should create a cordial and hospitable atmosphere.
13. Additional flexibility in the center is provided through outdoor space which is accessible and convenient.
14. Sufficient space is provided in each area for ease of mobility of students and for participation in a variety of learning experience.
15. Acoustical comfort should be provided in all instructional areas.
16. A controlled and balanced visual environment is important.
17. Atmospheric control factors to be considered are air and radiant temperature, relative humidity, and ventilation.

GENERAL CONSIDERATIONS FOR PLANNING FACILITIES

There are general factors to be considered so that facilities will be compatible with the Home Economics philosophy and program development.

Using these general factors, the following checklist has been designed to assist teachers/administrators in identifying local needs in planning facilities.

I. _____ area should be developed:

A.	As an independent unit	Yes	No
B.	In combination with _____ area(s)	Yes	No
C.	With lecture/seminar area	Yes	No
D.	With classroom/laboratory area		
	1. Large group	Yes	No
	2. Medium group	Yes	No
	3. Small group	Yes	No
	4. Individualized	Yes	No
E.	With consumer and homemaking emphasis	Yes	No
F.	With wage earning emphasis	Yes	No
G.	Other _____		

II. _____ area should be accessible to:

A.	Building entrance	Yes	No
B.	Outside play/patio area	Yes	No
C.	Lavatories	Yes	No
D.	Observation area	Yes	No
E.	Resource Center	Yes	No
F.	Instructional materials center	Yes	No
G.	Audio-visual center	Yes	No
I.	Other _____		

III. _____ area will accommodate:

A.	Students		
	1. Number	_____	
	2. Age	_____	
	3. Special Groups (identity)	Yes	No
	4. Pre-Schoolers	Yes	No

IV. _____ area should provide:

A.	Storage		
	1. Audio-visual equipment	Yes	No
	2. Books	Yes	No
	3. Student Projects	Yes	No
	4. Resource Materials	Yes	No
	5. Equipment		

a. Large Yes No
b. Small Yes No

6. Play Equipment
a. Large Yes No
b. Small Yes No

7. General Storage Yes No
Type _____

B. Classroom Space

1. Group activity
a. Large group Yes No
b. Medium group Yes No
c. Small group Yes No

2. Individual activity Yes No

3. Wage earning activity
a. Cooperative Yes No
b. Exploratory Yes No
c. Simulated Yes No

4. Independent listening - viewing stations Yes No

5. Seating required
Number _____
Types _____

6. Work surfaces required
Size _____
Number _____
Types _____

7. Chalkboard, bulletin board, Peg board, tack board Specify _____

C. Play Space

1. Inside Yes No
2. Outdoor Yes No

D. Observation area Yes No

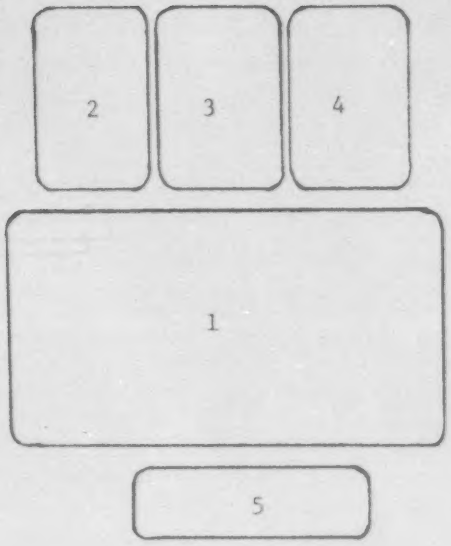
E. Other needs _____

V. _____ area utility needs are:

A. Electricity Yes No
B. Gas Yes No
C. Lighting Yes No
D. Water Yes No

AREA RELATIONSHIPS
CONSUMER AND HOMEMAKING EDUCATION

A.



*1. All - Purpose Room
2. Storage
3. Office/Conference Area
4. Preparation/Work Area
5. Display

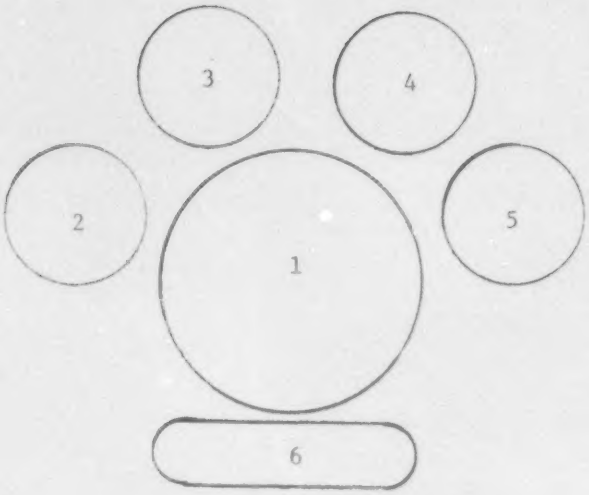
B.

*1. Clothing and Related Areas
*2. Family Living and Related Areas
*3. Foods and Related Areas
4. Storage
5. Office/Conference Area
6. Preparation/Work Area
7. Laundry
8. Display

*Square footage requirements depend upon Consumer and Homemaking program area selected, instructional areas utilized, instructional methods preferred, and the number of students served. Instructional areas can be combined depending upon the number of students to be served.

Contact the Home Economics Education Unit at the New Jersey Department of Education, Vocational Division, for further information and assistance.

AREA RELATIONSHIPS
HOME ECONOMICS RELATED OCCUPATIONS



*1. Occupational Laboratory
   a. Lecture - Demonstration Area
   b. Activity

2. Storage
3. Work/Preparation Area
4. Conference/Office Area
5. Observation Area
6. Display

*Square footage requirements depend upon occupations selected, instructional areas utilized, instructional methods preferred, and the number of student served. Instructional areas can be combined depending upon the number of students to be served.

Contact the Home Economics Education Unit at the New Jersey Department of Education, Vocational Division, for further information and assistance.

GENERAL CHARACTERISTICS FOR BASIC EQUIPMENT AND FURNISHINGS SELECTION

The effectiveness of instruction and the atmosphere of the department is influenced by the selection of equipment and furnishings.

General considerations for selecting equipment and furnishings are:

1. Supportive to curriculum.
2. Durable.
3. Versatile.
4. Convertible.
5. Expansible.
6. Up-to-date: such as appliances.
7. Characteristic of educational community.
8. Labor-saving.
9. Comfort/appropriateness.
10. Simulates home or industry.
11. Utilizes a variety of materials, finishes, construction and/or models.
12. Easily maintained.
13. Provides aesthetic value through design, color and harmony.
14. Safety and health factors.

*BASIC EQUIPMENT AND FURNISHINGS

Consumer and Homemaking Center

Clothing and related areas: home sewing machines, cutting tables, ironing and pressing equipment, tables, chairs, project storage, audio-visual equipment, mirrors, sink.

Child development area: adjustable leg tables, chairs, play equipment, book and project storage, audio-visual equipment, carpet.

Family Living Area: Living room furniture, dining room furniture, roll-away bed, carpet, one wall kitchen unit.

Foods and related areas: Ranges, refrigerator, freezer, dishwasher, disposer, washer, dryer, audio-vidual equipment, wall and base cabinet, small electric appliances, preparation and serving equipment, storage cabinet for aprons, food staples, linens, etc.

Home Economics Related Occupations

Child Care, Guidance, and Teaching: one wall kitchen unit, child size tables and chairs, children's toilet facilities, A-V equipment, fixed open and closed shelving and storage, movable open and closed shelving and storage, carpet, clothing storage, large and small inside play equipment, large and small outdoor play equipment.

Clothing, Apparel, and Textile Industry: Power sewing machines, button hole machine(s), over-edging machines, cutting tables, ironing boards, power press, steam press, dress form.

Food Service Industry: Bakery ovens, commercial dishwasher, commercial ranges, mixers, work table, scales, freezers, refrigerator, demonstration tables, portable hot and cold serving cart, bakery pan racks, cooling racks, steam kettle, washer, dryer.

Housing Design, Interior Decorating: Demonstration table, sinks, work tables, dining room furnishings, living room furnishings, bedroom furnishings, sewing machines, pressing equipment.

Institutional Household Maintenance Services: Demonstration table, work table, sinks, dining room furnishings, living room furnishings, bedroom furnishings, sewing machines, hospital bed, cleaning supply cart, washer, dryer, dishwasher, disposal, range, floor scrubber and polisher, carpet shampooer, commercial vacuum cleaner.

Family and Community Services: Consumer and Homemaking instructional area may be used.

*The above equipment and furnishings list is not exhaustive, but provides a basic list to be considered for the specific instructional area.

SCOPE

Industrial arts is an important area of education which contributes to the complete development of all youth. Industrial arts programs are those education programs which pertain to the body of subject matter or courses organized for the development of understandings about the technical, consumer, occupational, recreational, organizational, managerial, social, historical, and cultural aspects of industry and technology. Included are learning experiences involving activities such as experimenting, designing, constructing, evaluating, and using tools, machines, materials, and processes which provide opportunities for creativity and problem solving.

Industrial arts education recognizes the various influences which the industrial and technological aspects of our culture exert upon individuals and groups and recognizes the interrelationships between the development and industry, technology, and the development of civilization.

In addition to developing individuals in terms of general education objectives, industrial arts education serves a unique role. Much of its content requires the use of abstract reasoning in practical situations. This process leads to a greater understanding of the content which is unique to industrial arts education and reinforces and enhances understandings in related fields. Illustrative of the fields to which industrial arts contributes heavily are: engineering, chemistry, physics, vocational education, mathematics, social science, and business. Industrial arts education, as a part of general education, deals with facts, understandings, and appreciation which all persons living in an industrial society should possess. As a part of vocational and career education, it contributes significantly toward the understanding of and preparation for participation in the world of work.

INSTRUCTIONAL AREAS

Designing an effective, safe and efficient industrial arts facility must be predicated on a complete understanding of the philosophy and objectives of industrial arts education coupled with a careful determination of the scope and content of the course of study to be offered. A well organized pre-planning system must be adhered to if the facilities are to meet the educational needs of the community.

Some of the factors that must be considered in pre-planning are: grade levels, number and length of class periods, anticipated student enrollments and maximum class size. Also, careful attention must be given to provide for the needs that will be dictated by future technological and educational advances. The facilities must be versatile and flexible enough to allow changes to be incorporated into them.

THE ELEMENTARY SCHOOL INDUSTRIAL ARTS SHOP

The general education function of Industrial Arts at the elementary level (K-6) places emphasis upon the planning, construction and experimenting with industrial processes associated with elementary subject areas, such as social studies, science, mathematics, and language arts. Students receive satisfaction and understanding by producing objects which they have previously tried to visualize. Industrial Arts activities are integrated with other learning experiences. This can best be accomplished in a general shop atmosphere where multiple activities may take place at the same time. The shop should provide ample space to facilitate this concept.

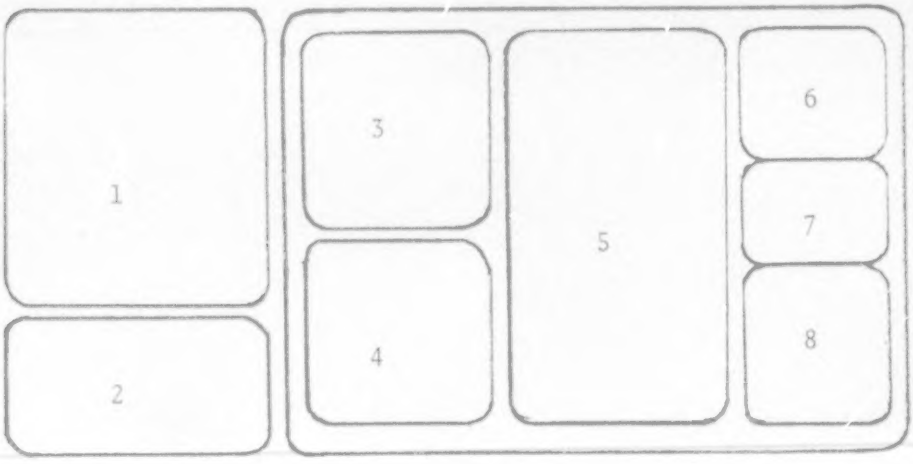
Special consideration must be given to the selection of tools, equipment, machines, and furniture for the elementary industrial arts shop. These items must be evaluated against the maturity level and physical development of the elementary school child.

THE JUNIOR HIGH/MIDDLE SCHOOL INDUSTRIAL ARTS SHOP

The industrial arts program at the junior high/middle school level should provide a series of industrially orientated exploratory opportunities which are desirable for the basic education and career guidance of all students.

A large school district would best provide industrial arts opportunities in unit shops such as: drafting, woodworking, metalworking, power mechanics, graphic arts and electricity, as the needs of the community dictate.

The small school should provide a comprehensive general shop and a separate drafting room. The shop should allow for experiences and activities in such areas as: woodworking, metalworking, power mechanics, graphic arts, electricity and plastics.



1. Drafting
2. Storage
3. Wood
4. Metal
5. Power Mechanics
6. Graphic Arts
7. Electricity
8. Plastics

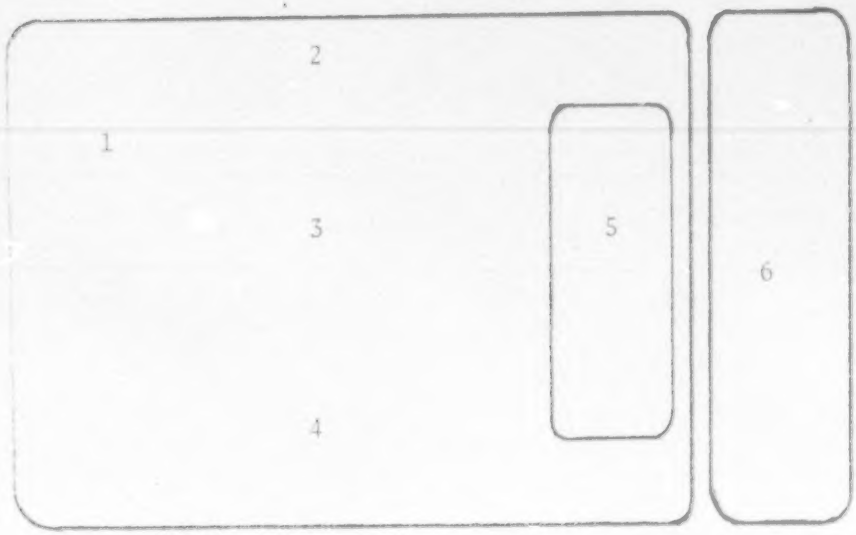
Types of Equipment

Grinder, drill press, scroll saw, jointer, circular saw, wood/metal cutting band saw, disc sander, belt sander, surface planer, wood lathe, metal lathe, plastics oven, vacuum former, injection molder, buffer, squaring shear, slip roll, notcher, bender, gas/arc welder bench, spot welder, work benches, drawing tables, storage units.

An alternate Industrial Arts program for the junior/high middle school is "Construction", "Manufacturing," "Transportation," and "Communications."

The type of facility for each of these programs is quite different from the traditional Industrial Arts shop. For instance, the construction program requires a minimum of machinery but necessitates a maximum amount of open space, with provisions for a lecture area.

Space allocations may be represented as follows:



1. Machine Area
2. Open Space
3. Work Area
4. Open Space
5. Group Instruction
6. Storage and Supplies

Types of Equipment

Circular saw or radial arm saw, jointer, power miter box, portable electric tools.

The "Manufacturing" shop resembles an industrial production laboratory with benches, machinery and equipment similar to that of a general shop. Space allocations for this type of a program may be represented as:

1. Hot Metal Area
2. Wall Bench and Storage
3. Equipment and Machine Area
4. Benches and Instructional Area
5. Wall Bench and Storage
6. Storage
7. Group Instruction

Types of Equipment

Drill press, bandsaw, jig saw, disc or belt sander, slip roll, table saw, box and pan break, squaring shear, spirit duplicator, bar folder, anvil.

THE SENIOR HIGH SCHOOL INDUSTRIAL ARTS SHOP GRADES 9-12

The senior high school program has exploratory value for learners who lack industrial arts experience. Those with previous industrial arts experiences may begin to concentrate in a given area, such as electricity-electronics, architectural drafting, power mechanics, or graphic communications. At this point, work standards may approach those required in industry. Learners are given considerable depth in a field of their choice which provides for greater insight into occupational careers. The skills and knowledge acquired may be used vocationally, avocationally, and in helping to solve consumer problems. The industrial arts program also makes valuable contributions to the college-bound student. For many of these students, this will be their only first-hand experience with the industrial aspects of our culture prior to making a career choice.

As a general rule, the unit shop system prevails at this grade level. A separate facility is provided for each subject area such as: woodworking, metalworking, auto mechanics, graphic arts, electricity-electronics and drafting.

Space allocations for each of these areas should include bench work area, machine and equipment area, instructional area, project storage area, supply storage area, wash area and lavatory facilities wherever feasible, planning area, and instructors office.

FACILITY DESIGN

GENERAL CONSIDERATIONS

LOCATION

Noisy shops should be located so that the noise does not disturb other educational activities.

Shops should be easily accessible for the delivery of large equipment, supplies and for the use of evening school personnel and students.

Location should facilitate future expansion with a minimum of alteration to building design and construction.

FLEXIBILITY

Nonbearing partitions should be used for internal partitioning of shop areas.

Utilities should be installed in such a manner that expansion or renovation of the shop or movement of or addition to equipment and machinery is facilitated.

SIZES

The generally accepted design width to length ratio is 2:3.

Ceiling heights should be 12' to 14' feet. Shops in which vehicle lifts will be used should base the ceiling height on recommendations of the lift manufacturer.

AUXILIARY ROOMS/AREAS

Each shop should have as a minimum, auxiliary space for the storage of supplies, special tools, and student projects.

Other areas to be considered for inclusion are planning center, shop library and instructor's office.

Adequate space should be provided for the use of audiovisual aids and equipment.

A separate finishing room equipped with adequate spray equipment and ventilation is necessary for shops in which finishing is done.

VENTILATION

Dust, smoke, odors, fumes, vapors and gases should be exhausted by mechanical means.

Humidity should be kept within a range of 30% to 50% for health reasons and for stability of equipment and stored materials.

FLOORS AND SURFACES

All building surfaces should be pleasing in appearance, easy to clean, durable and easily repairable.

Flooring materials should be chemical and water resistent, easily cleaned, resistent to denting and compression, slipproof and fireproof.

Windows should be placed at a height that will provide useable wall space beneath the sill and prevent outside activities from becoming distractions to students.

SCOPE

Vocational-Technical Education is instruction that is structured to develop basic manipulative skills, safety judgment, technical knowledge and related occupational information. The purpose is to prepare persons for initial employment within a cluster of job opportunities in a specific area as well as upgrading or retraining workers presently employed in industry.

In a number of instances students can best be served by developing entry level skills through an occupational cluster experience. Many times this will open up additional employment opportunities for students. In every case, whether or not the school follows the cluster concept or individual shop plan, the philosophy must be spelled out in the educational specifications. Whatever the district determines will best serve the needs of the community should be the plan to follow.

The instructional facilities and equipment should be comparable to that found in the actual occupation.

The information for planning instructional space will be presented for individual shops as well as suggested information relative to combining activities into a cluster arrangement.

The selection of instructional space will depend upon a number of factors:

Activity to be carried out

Method of instruction

Number of students to be served

Equipment to be used

Type of project the student will be involved with

Working space around equipment and project

CLUSTER RELATIONSHIPS

One of the concepts in Vocational Education, which has been implemented by a number of schools in varying degrees, is the idea of clustering certain shop areas for the purpose of bringing about a broader base of educational experiences.

Some of the factors justifying such action are as follows:

1. Certain basic processes are common to a number of trade areas.
2. It enables the student to become familiar with a number of closely allied trades.
3. It permits the student to acquire saleable skills in more than one specific trade area.
4. The exceptional student may develop competencies in two or more trade areas, thereby providing additional placement opportunities.
5. The student who is unsure of his occupational preference has an apportunity to have a variety of interrelated experiences before deciding on a specific area to pursue.
6. Job placement opportunities are generally greater as the student will have developed additional basic skills.
7. A greater flexibility of activities will occur within a shop because of a greater variety of equipment.
8. The common use of certain areas e.i., Locker and Toilet Facilities, Storage, Wash Up Area, Lecture (class room) space and certain pieces of equipment reduce building costs.
9. Team teaching can easily be utilized.
10. Total overall space saving will take place.
11. Program flexibility can be much greater when utilizing the cluster concept.

SUGGESTED CLUSTER PROGRAMS

Metal Trades

Machine Shop
Welding
Tool & Die

Building Trades

Carpentry
Masonry
Electrical
Plumbing & Pipe Fitting

Mechanic-Maintenance

Automotive
Diesel
Body & Fender
Small Engine Repair

Foods

Commercial Foods
Baking

Visual Communications

Commercial Art
Commercial Photography
Printing
Graphic Arts

Electronics-Electrical

Appliance Repair
Electronics
Electrical
Radio-TV Repair

Temperature Control

Air Conditioning, Heating
Ventilating
Sheet Metal

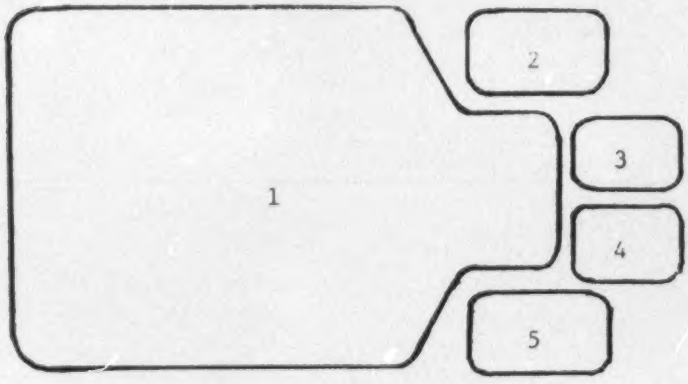
Guidelines for the more common Vocational-Technical facilities follow. There are many other program areas which may be offered in vocational facilities but the ones included in this Guide are the most prominent. Contact the Director, Vocational-Technical Industrial Education at the New Jersey State Department of Education, Vocational Division, for further information and assistance.

OE # 17.0199 AIR CONDITIONING, HEATING AND VENTILATING

Program Activities

Numerous types of units will need to be serviced in an air conditioning, heating and ventilating program. Air conditioning components vary as to size and types. Heating units may be gas, oil or coal fired and may involve hot air, hot water or steam. Electric heat is also involved. Pressures will vary according to the specific type of equipment. Ventilation includes duct work, piping, fans, filters, air washers, etc. Actual work including tests will be carried out on the different units.

Instruction Area



1. Instructional Ar
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration

Utility Requirements

Hot and cold water should be available. A floor drain is essential. Compressed air should be available. A gas line with enough volume and pressure to operate a number of gas fired furnaces. Both 110v and 220v electrical outlets should be available.

Special Features

It is essential that there be an exhaust hood over the refrigerator test area. A chimney with a flue should be built at the time the building is constructed. A furnace oil storage tank is used for the operation of an oil furnace. There must be a door large enough to move heating plants in and out. Provisions will need to be made to install typical heating and cooling units that are operational, as not too many units from the outside will be brought into the school shop for service. The school heating plant as well as the cooling system should be used for realistic instructional purposes.

Equipment

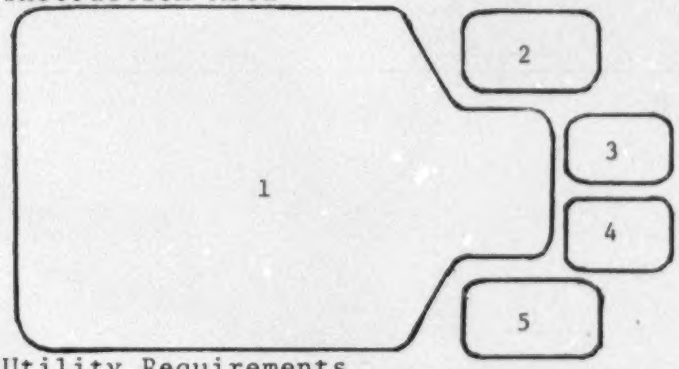
Bench Grinder, Power Hacksaw, Oxy-Acetylene Welding & Cutting Outfit, Power Pipe Threader & Cutter. Parts Cleaner, Oil and Gas Burners, Air Conditioners, Humidifiers, Squaring Shear, Bar Folder, Heating Boiler, Home Freezer Unit, Electric Heating Unit, Combustion Analyzer, Smoke Detector Kit.

OE # 17.02 APPLIANCE REPAIR

Program Activities

Many different activities may be carried out in an appliance repair shop. This will include electricity, plumbing, heating and mechanical repairing in varying degrees. The number of different appliances which are serviced will depend upon the needs in the area. Units commonly serviced in an appliance repair program include washing machines, clothes dryers, unit air conditioners, blenders, mixers, refrigerators, freezers, dish washers, garbage disposals, electric stoves, pumps, etc. Some shops may include basic electronics so as to service record players, radios, etc. It can become a very flexible training center.

Instruction Area



1. Instructional Area
2. Tool Crib
3. Lockers
4. Storage
5. Demonstration

Utility Requirements

Hot and cold water should be available. Compressed air is necessary. A floor drain is needed in the washing machine repair area. There should be 110 volt wall plugs installed around the walls approximately four feet apart where work is carried on. 220 volt electricity must be available.

Special Features

A fume hood needs to be installed over the refrigerator repair area. Provisions should be made for loading and unloading appliances and moving them in and out of the shop easily. A lock-up area is needed for storing appliances.

Equipment

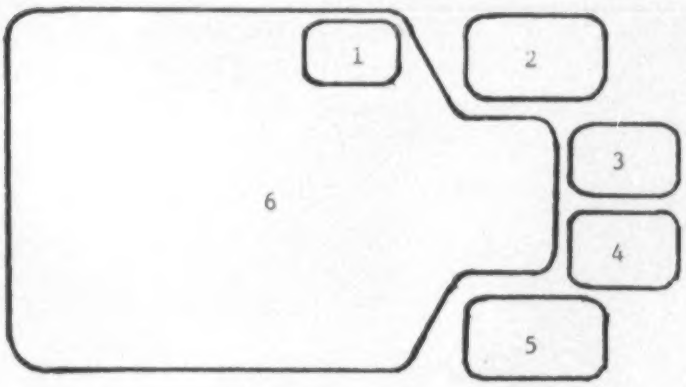
Drill Press, Bench Grinder, Arbor Press, Dryer-Electric and Gas, Washing Machine, Electric Test Bench, Refrigerator, Dish Washer, Stove-Electric and Gas, Air Conditioner, Parts Cleaner, Oxy-Acetylene Welder.

DOT # 17.0301 AUTO BODY AND FENDER

Program Activities

Auto body and fender shops repair and replace damaged sheet metal parts of an automobile. Refinishing of complete automobile bodies or merely parts of the automobile body is also carried on in the auto body and fender shop.

Instructional Area



1. Spray Booth
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration
6. Instructional Ar

Utility Requirements

Hot and cold water should be available.
Compressed air should be provided with a water trap and pressure regula
Gas should be available. Both 110v and 220v electrical outlets should be available. A floor drain gutter with a grille should be the full length of the shop.

Special Features

An 18" carbon monoxide barrier is mandatory at inside entrances. An approved spray booth must be located within the shop so it is easily accessible to drive into. The booth should be at least 15' x 24'. It must have a separate exhaust system and all switches, lights and motors must be vapor proof. Paint and paint thinner will have to be stored in a separate and closed space that meet local fire codes. There needs to be a fenced compound for auto storage and ample lock up space in the shop for parts removed from the vehicles being repaired. All overhead doors should have a minimum width of ten feet. A bay for washing a vehicle is essential. Built-in "tie downs" should be installed in the floor for frame alignment. A mono-rail for a chain hoist should be installed. A twin post hydraulic hoist should be installed in the floor. Include a built in exhaust removal system in floor.

Equipment

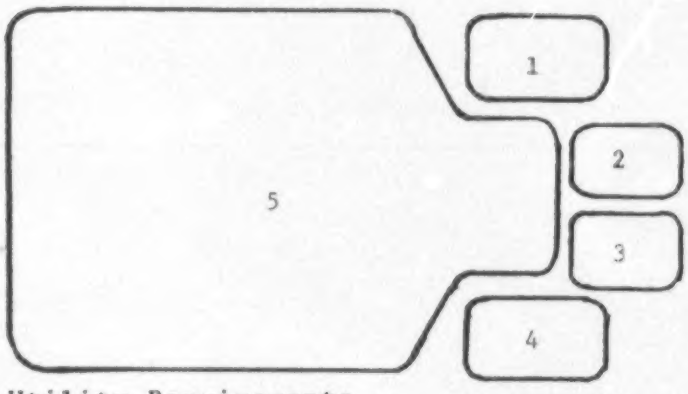
Wheel Alignment Rack, Paint Shaker, Paint Mixer, Hydraulic Arbor Press, Bench Grinder, Drill Press, Oxy-Acetylene Welding Outfit, Spot Welder, Body and Frame Straightening Outfit.

OE # 17.03 AUTO MECHANICS

Program Activities

Classroom and practical work experience involving the repair and service of all different makes of current automobiles. The work, to be meaningful, must be done on operable and usable automobiles. Operating components of different automobiles should be owned by the school for beginning students to work on. While some types of service work is more common than others, the student should have the opportunity to experience all phases of automobile service work.

Instructional Area



1. Storage
2. Tool Crib
3. Lockers
4. Demonstration
5. Instructional Area

Utility Requirements

Floor drain in parts cleaning area.
Compressed air is necessary
Hot and cold water should be available.
An underfloor forced draft exhaust system is necessary.
Both 110v and 220v electrical outlets should be available.

Special Features

Off street parking. Fenced in area with locking gate adjacent to shop. Easy entrance and exit to street. Floor drain gutter with grille- full length of shop. A minimum of two hydraulic lifts should be installed at the time of construction. Overhead doors should be a minimum of 10' wide. A monorail is necessary for lifting and moving heavy objects. An 18" carbon monixide barrier is mandatory at inside entrances. Ceiling height should be a minimum 15'.

Equipment

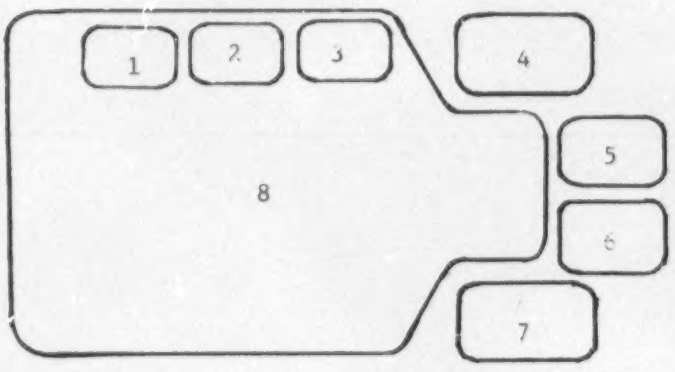
Battery Charger, Arbor Press, Brake Lathe & Shoe Grinder, Steam Cleaner, Solvent Cleaner, Engine Stands, Engine Analyzer with Scope & Infra-Red, Bench Grinder, Valve Machine, Wheel Aligner, Wheel Balancer, Tire Changer, Alternator-Generator-Regulator Tester, Distributor Machine, Oxy-Acetylene Welder.

OE # 17.10 BUILDING TRADES

Program Activities

Classroom and practical work experience involving the many aspects of the building trades should be pursued. The major portion of the work will evolve around the construction trades with emphasis on residential construction and the allied trades, such as masonry, plumbing, and electrical. It is strongly suggested that an actual residence be constructed or an older home be renovated. Most of the actual work should be carried on the field.

Instructional Area



1. Masonry
2. Electrical
3. Plumbing
4. Storage
5. Tool Crib
6. Lockers
7. Demonstration
8. Instructional Area

Utility Requirements

Overhead buss duct for flexible power
Water
Compressed Air
Gas
Floor drain in masonry area
Dust collection system for carpentry and masonry

Special Features

Fenced in lock-up area for masonry storage and work area outside.
Cement platform for small construction work outside.
Bare floor (dirt) area for masonry construction inside.
House frame for basic instruction in plumbing and electrical 10' overhead door.

Equipment

Circular Saw, Radial Saw, Drill Press, Bench Grinder, Concrete Mixer, Pipe Cutting and Threading Machine, Floor Finishing Machine, Planer, Band Saw, Masonry Saw Sander, Electrical Bench.

OE # 17.1001 CARPENTRY

Programs Activities

Carpentry involves building in general. Some schools will build a house on a lot in the community or on school property for later removal. Some build sections of a house inside the shop and then dismantle it. Others will build facilities for the school or may build garages, tool sheds, etc. which can be moved whole or disassembled or moved in sections.

Instructional Areas

1. Storage
2. Tool Crib
3. Lockers
4. Demonstration
5. Instructional Area

Utility Requirements

A busduct should be installed for flexibility. A dust collector must be used on the various machines. Compressed air should be available. Water, sink and a floor drain should be installed. 110v and 220v electrical outlets should be available.

Special Features

There should be a minimum ceiling height of sixteen feet. If foundation work is going to be done there should be an earthen area left within the shop. A large overhead door is necessary if sections of a building are to be moved out. It should be possible to move long pieces of lumber directly into the shop. A fenced in storage area is advisable for storage and for building small movable buildings.

Equipment

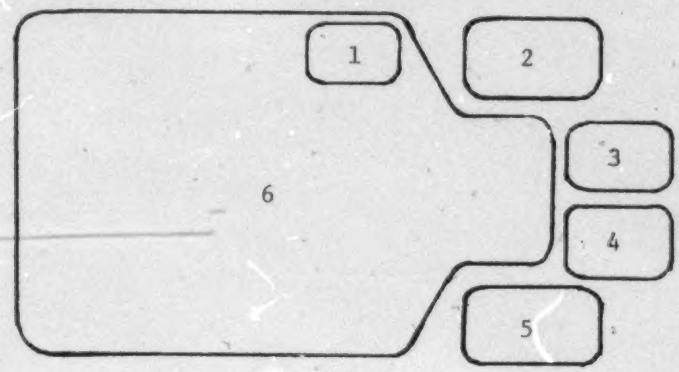
Radial Saw, Drill Press, Bench Grinder, Table Saw, Jointer, Cement Mixer.

OE # 16.0105 CHEMICAL TECHNOLOGY

Program Activities

The facility for chemical technology will be much the same as for a regular chemical program except that provisions must be made for a considerable amount of "hands-on" experience. As chemistry is a broad field, the course should be geared to meet the needs of industry in the area. The student should develop a general background in chemistry, but phases which apply directly to the chemical industries in the area should be stressed.

Instructional Area



1. Balance and Instruments
2. Tool Crib
3. Lockers
4. Storage
5. Demonstration
6. Instructional Area

Utility Requirements

Hot and cold water, drains and sinks should be available. 110 volt and 220 volt electricity should be available at wall plugs and the chemical tables which are a part of any chemical program. Gas and compressed air is needed.

Special Features

A ventilated fume hood is necessary. A chemical demonstration table as well as the usual chemical work tables are necessary. A separate room is needed for balance work, microscope and instrument work. Flexibility is necessary in order to provide the needed training.

Equipment

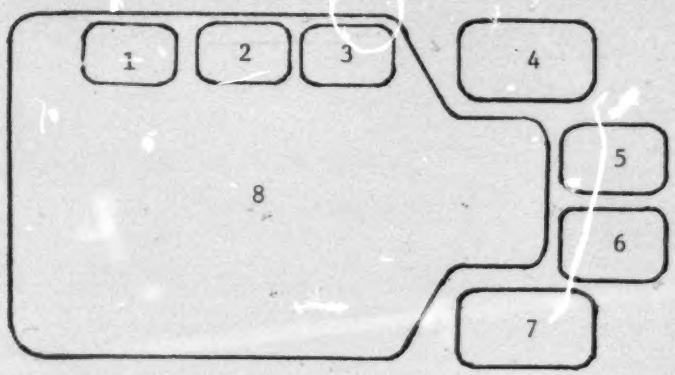
Specialized equipment to fit the objective of the course, Bench Grinder, Chemical Benches, Spectrophoto Meter, Hardness Tester, Analytical Balances, Calorimeter, Centrifuge, Furnace, Arbor Press, Drill Press, Microscopes, Oven, Vacuum Pump.

OE # 16.0106 CIVIL TECHNOLOGY

Program Activities

A number of activities are involved in a civil technology program. Most schools will use the regular chemical laboratory and drafting room for that particular phase of the program. However, a certain amount of chemistry equipment and drafting equipment is needed in the facility. The usual activities will include surveying, hydraulics, concrete, soil, strength of materials, chemistry and drafting.

Instructional Area



1. Moisture (curing room)
2. Chemistry Room
3. Hydraulic Room
4. Storage
5. Tool Crib
6. Lockers
7. Demonstration
8. Instructional Area

Utility Requirements

Hot and cold water, a sink and floor drain should be available. An overhead busduct for 110 volts and 220 volts is essential and 110 volt wall plugs. Compressed air and gas should be installed. High intensity lighting should be available in certain areas.

Special Features

A separate room to control the moisture for curing cement is needed. Because of the dust and dirt involved in working with cement and soil a separate room is needed for the hydraulic testing area and the chemical testing area. A fume hood is needed in the chemistry area. An equipment lock-up storage area is essential as much of the equipment is used on a part time basis.

Equipment

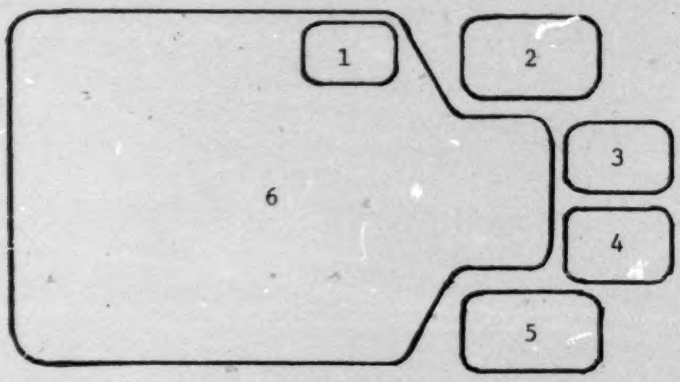
Concrete Mixer, Flow Tester, Compression Tester, Hardness Tester, Surveying Equipment, Hydraulic Tester, Balances.

OE # 17.07 COMMERCIAL ART

Program Activities

The creating of advertising materials, signs, show cards and related art work are the primary activities carried on in a commercial art program. A certain amount of copy, photography and duplicating work will also be part of the course. Creativity on the part of the student so as to be able to produce work of a practical and useful nature is of importance.

Instructional Area



1. Dark Room
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration
6. Instructional Ar

Utility Requirements

Temperature controlled sink in dark room. Compressed air with a pressure regulator and water trap. Both 110v and 220v electrical outlets. Slop sink for cleaning brushes. Hot and cold water. Special lighting for photography work.

Special Features

A ventilating hood arrangement is necessary for the air brush work area. Special ventilation must also be provided for a print making machine. A storage cabinet for paints, thinners, etc. must be provided that will meet safety regulations. Table and bench space is of prime importance for a course of this type. A dark room is needed for developing and enlarging pictures.

Equipment

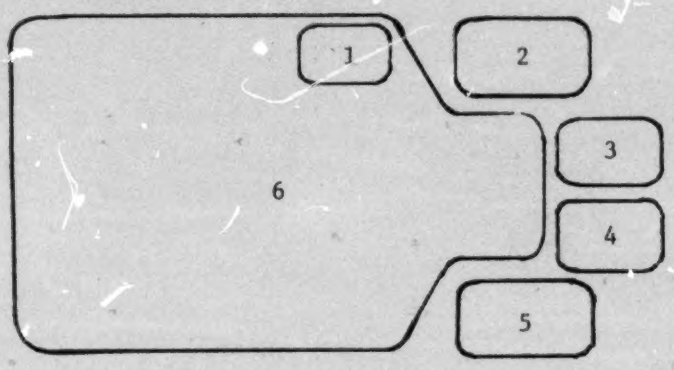
Camera, Enlarger, Air Brush Equipment, Contact Printer, Print and Negative Dryer, Print Washer, Table Saw, Bench Grinder, Oxy-Acetylene Welding Outfit, Photo Copier, Reproduction Machine, Drill Press, Paper Cutter.

OE # 17.2602 COSMETOLOGY

Program Activities

Classroom and practical work involving the care and styling of hair, facials and experience in manicuring and pedicuring is carried on in a Cosmetology program. A state licensing examination must be taken and passed after graduating from high school to be eligible to work in the trade. A separate manicuring and pedicuring license may be obtained without a cosmetology license.

Instructional Area



1. Reception Area
2. Storage
3. Tool Crib
4. Locker Room
5. Demonstration
6. Instructional Area

Utility Recommendations

A good supply of hot and cold water must be available as well as necessary drains for the numerous sinks which must be installed. Due to the nature of the activity to be carried on in the room the electrical wiring should be installed in duct work in the floor Numerous 110 volt receptacles should be installed along at least three walls to take care of the various pieces of electrical equipment that are part of the course. 220 volt outlets must also be available. A sink should be located in the storage area for mixing solutions.

Special Features

A reception area should be included so students may gain experience dealing with customers. An entrance directly from the outside is advisable if clients from outside the school are to be served.

Equipment

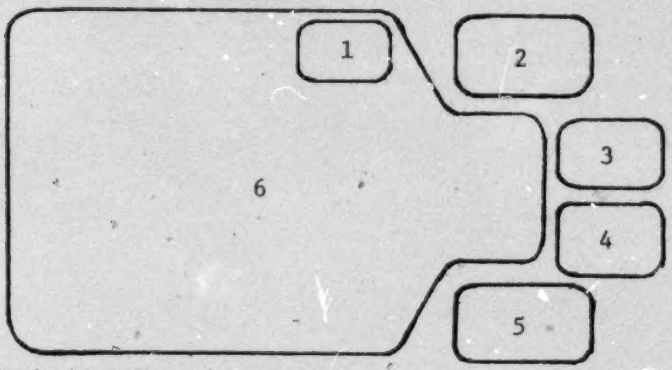
Sterilizer, Shampoo Basins, Styling Stations, Dryer Chairs, Hydraulic Utility Chairs, Styling Chairs, Manicure Tables, Display Case.

OE # 17.13 DRAFTING

Program Activities

Drafting rooms are much the same regardless of whether mechanical drafting, architectural drafting or related drafting is to be taught. To develop good line quality considerable practice is necessary. Real objects should be used for making drawings rather than doing mere exercise work.

Instructional Area



1. Reproduction Room
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration
6. Instructional Area

Utility Requirements

Compressed air with a water trap and regulator. 110v and 220v electrical outlets. Water and a sink should be installed.

Special Features

Good lighting is of utmost importance. Ideally there should be 100 foot candles of shadow free illumination on the drafting board. Special ventilation is necessary for the print machine. A ventilating fume hood needs to be installed over the area where air brush work is done. Considerable chalk board space is advisable.

Equipment

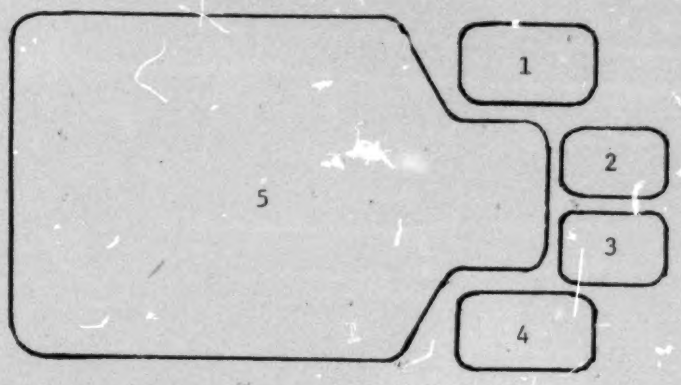
Reproduction Machine, Blackboard Drafting Machine, Tracing Table.

DOT # 17.1002 ELECTRICAL

Program Activities

An electrical trades shop should include many of the different phases of the electrical trade so as to serve students with varying ability levels. Emphasis is usually placed on house and commercial wiring, electric motor testing and repair, circuitry and switches. The training should be broad enough so as to prepare the students for different jobs within the trade.

Instructional Area



1. Storage
2. Tool Crib
3. Lockers
4. Demonstration
5. Instructional Area

Utility Requirements

An overhead busduct should be installed for flexibility. 110v, 220v and 440 volt electricity should be available. Numerous wall plugs with 100 volts should be along each wall. Compressed air should be available. Include a power panel with a motor-generator set to give various voltages and amperages in both A.C. and D.C.

Special Features

Several wiring booths for house wiring experience should be built into the room. Depending upon the type of activity to be conducted, it might be practical to have poured concrete bases for motor-generator sets put in at the time of construction.

Equipment

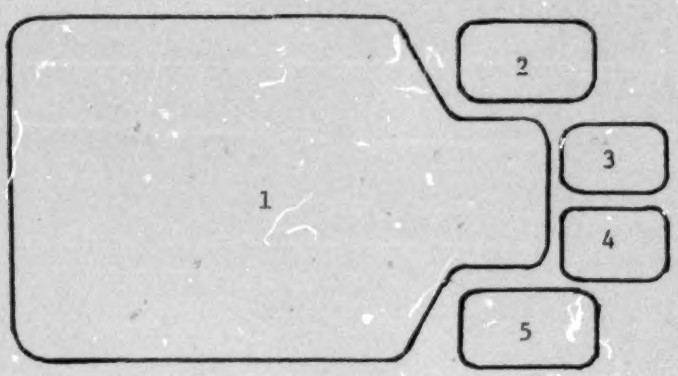
Drill Press, Bench Grinder, Small Lathe, Conduit Bender, Pipe Threader and Cutter, Prony Brake and Scale, Electrical Test Bench, Arbor Press.

OE # 16.0109 ELECTRO-MECHANICAL TECHNOLOGY

Program Activities

A variety of activities take place in an electro-mechanical technology program depending upon the industries to be served. An electro-mechanical technician needs to understand basic mechanics as well as the basics of electricity, pneumatics and hydraulics. The technician should be able to identify problems which arise in machines which perform tasks mechanically but are controlled by electricity, pneumatics or hydraulics.

Instructional Area



1. Instructional Area
2. Tool Crib
3. Lockers
4. Storage
5. Demonstration

Utility Requirements

Hot and cold water should be available. An overhead busduct should be installed for flexible power. 110 volt wall plugs are needed. Compressed air and gas is essential.

Special Features

A number of machines should be available in both the mechanical as well as the electrical area. The machines, should be of the type on which the student will work in industry. Becoming familiar with the component of the machine, its operation and troubles which may develop is necessary. A vending machine may be an example of an electro-mechanical piece of equipment which lends itself to this type of training.

Equipment

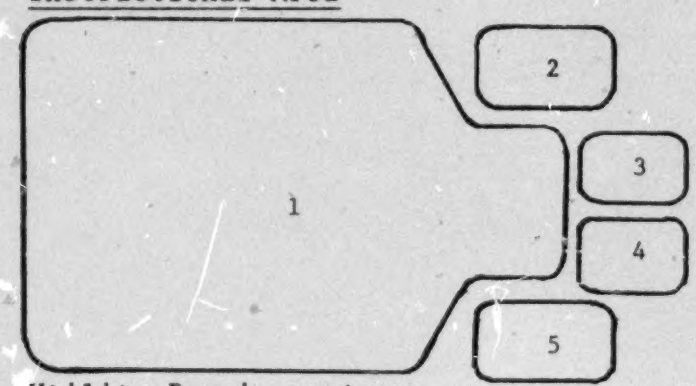
Drill Press, Electric Test Bench, Arbor Press, Bench Grinder, Lathe, Hydraulic Test Bench, Pneumatic Test Bench, Oxy-Acetylene Welding Outfit.

OE # 17.15 ELECTRONICS

Program Activities

Electronics is a broad field which can include many levels of achievement. It may include radio, television, record players, stereo equipment and other electronic devices of this nature. Some students may progress into basic computer service or industrial electronics. The study of electronics can open up a vast number of opportunities for employment. Equipment may vary from the simple basic to considerable sophistication, depending upon the determined goals and employment needs.

Instructional Area



1. Instructional Area
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration

Utility Requirements

An ample electrical supply in the form of wall plugs will be needed around the periphery of the room. 110 volts should suffice, however, 220 volts should be available in the room. Under floor duct work for an electrical supply to the work benches will make for a neater appearing room. Compressed air is necessary.

Special Features

Antennas for TV, VHF, UHF and AM, FM radio is necessary. Built-in interference prevention in the form of protective copper screen inside all four walls is desirable. Because of the variety of activities which may be carried on, flexibility is essential. A special separate storage space for high-cost percision test equipment is suggested.

Equipment

Drill Press, Bench Grinder, Arbor Press, Electrical-Electronics Test Benches, Power Supplies, Oscilloscopes, Transformers, Signal Generators, Various Testers, Demonstration Units, Trainer Units, Metal Shear, Break.

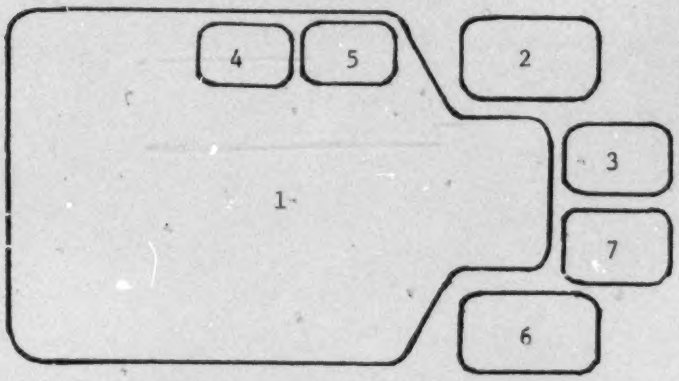
OE # 17.2699

FOOD SERVICE

Program Activities

A number of different activities related to quantity baking and the preparation and serving of quantity foods are carried on in this program. The program is normally operated using the facilities of the school cafeteria plus additional equipment and space. The faculty lunch room is usually used as a training station. Some school systems may operate baking and commercial foods as separate courses.

Instructional Area



1. Instructional Area
2. Storage
3. Lockers
4. Freezer
5. Can Room
6. Faculty Dining Room
7. Demonstration

Utility Requirements

An overhead busduct should be installed to permit flexibility in the locating of electrically operated equipment. 110 volts and 220 volts should be available with ample amperage. Hot and cold water with individual floor drains must be available. A fume hood is needed over the ranges and ovens. Special ventilating fans are needed to remove excessive heat. An ample supply of gas is necessary.

Special Features

A small room with an outside door to the back of the building for garbage disposal is essential. The room should have a floor drain and shower head for can cleaning. A walk-in freezer should be installed when the building is constructed. A display case should be located near the corridor to display goods which are for sale.

Equipment

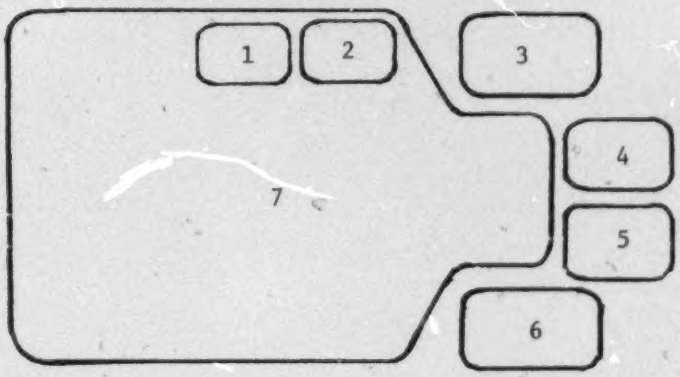
Ranges, Ovens, Deep Fryer, Dish Washer, Freezers, Broilers, Slicing Machine, Mixers, Steam Table, Dough Mixing Machine, Refrigerators, Do-Nut Machine, Infra-Red Oven, Micro Wave Oven.

OE # 17.19 GRAPHIC ARTS

Program Activities

Graphic Arts offers many different types of activities such as photography, duplicating, photo offset, and silk screen to name a few. The depth and size of the program will be determined by the amount of space available, the equipment, and the employment needs of the area. A program of this type can accommodate students with many different levels of ability. The shop is usually operated as a production shop.

Instructional Area



1. Dark Room
2. Dark Room
3. Storage
4. Tool Crib
5. Lockers
6. Demonstration
7. Instructional Area

Utility Requirements

Compressed air and gas should be available in the room. An overhead busduct carrying 110v and 220v should be provided. Hot and cold water and a slop sink should be installed. 110v and 220v electrical outlets are needed along the walls.

Special Features

Ideally a graphics art shop should have two dark rooms. A special wash sink is needed in the dark rooms along with a thermostatic water mixing valve. Special lighting is needed in the dark rooms and a light proof entry is necessary. The dark rooms need a good ventilating system along with filtered air. Provisions must be made for paper storage.

Equipment

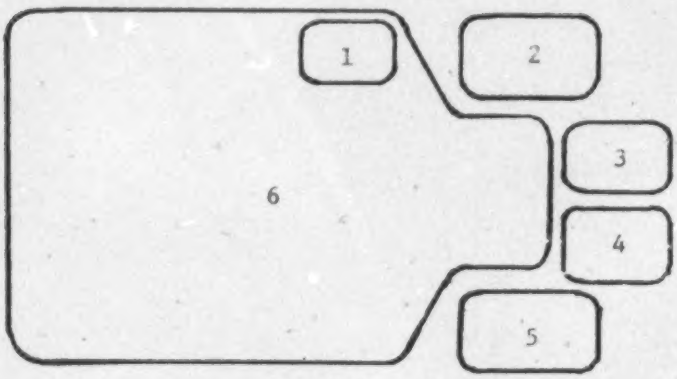
Cameras, Light Tables, Offset Press, Proof Press, Paper Folder, Enlarger, Multilith Offset Press, Stripping Table, Developing Sink, Headliner, Collator, Stapler, Stitcher, Heidelberg Press, Folder, Paper Cutter, Paper Drill, Vari-Typer, Jogger.

OE # 17.100301 HEAVY DUTY TRUCK MECHANIC

Program Activities

A heavy duty truck mechanic shop services and repairs all different makes of diesel and gasoline operated trucks. Work to be meaningful must be done on operating units and experience should be gained on all of the components of a truck. Operating units of different trucks should be owned by the school for beginning students to repair.

Instructional Area



1. Clean Room
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration
6. Instructional Area

Utility Requirements

Hot and cold water should be available. Compressed air is necessary. Both 110v and 220v electrical outlets should be provided. An overhead forced draft exhaust system is necessary. A floor drain is needed in the parts cleaning area. A floor drain gutter with a grille should extend the full length of the shop.

Special Features

A minimum of two hydraulic lifts should be installed when the building is constructed, preferably of the twin post type. The doors should have a minimum width of fourteen feet. There should be a paved area of at least twenty-five feet in depth in front of the doors. A fenced compound for vehicle storage is recommended. There should also be parking spaces provided for the shop vehicles. A monorail is necessary for lifting and moving heavy objects. A minimum of a fifteen foot ceiling is necessary. A dynamometer should be installed in the floor when the building is constructed. A clean room is needed for injector work. Steam cleaning and individual parts cleaning facilities are part of a shop, provisions should be made for this equipment. An 18" carbon monoxide barrier is mandatory at inside entrances.

Equipment

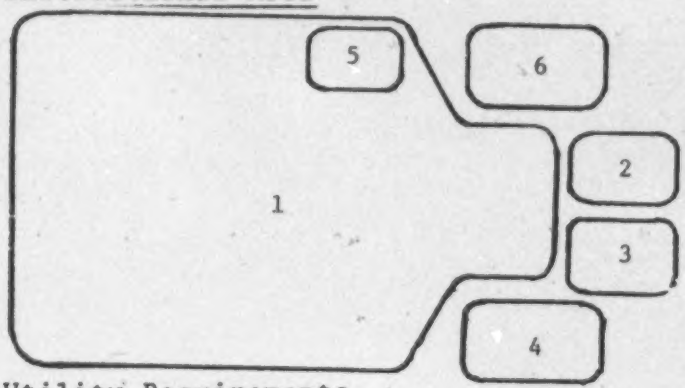
Steam Cleaner, Solvent Cleaner, Battery Charger, Injector Service Equipment, Arbor Press, Alternator-Generator-Regulator Tester, Valve Machine, Tire Changer, Bench Grinder, Oxy-Acetylene Welder, Engine Analyzer with Scope and Infra-Red. Battery-Starter Tester, Front Wheel Aligner, Brake Service Unit.

OE # 16.06 LABORATORY TECHNICIAN

Program Activities

Laboratory technicians may perform many duties in one of several areas. They may work in chemical laboratories, mechanical laboratories, as well as in laboratories of various manufacturing plants. They may assist the chemist, the engineer or the scientist in performing various weighing, measuring and/or calculating operations. Environmental control operations in water, waste water may also be included. Smoke control and other pollutions problems can be part of the work of a laboratory technician.

Instructional Area



1. Instructional Area
2. Storage
3. Lockers
4. Tool Crib
5. Balance and Instrument
6. Demonstration

Utility Requirements

Hot and cold water and drains should be available. 110 volt and 220 volt outlets are required and should also be provided for chemistry and physics tables. Compressed air and gas is needed.

Special Features

An instrument and balance scale room is necessary. A fume hood is needed for the chemical test area.

Equipment

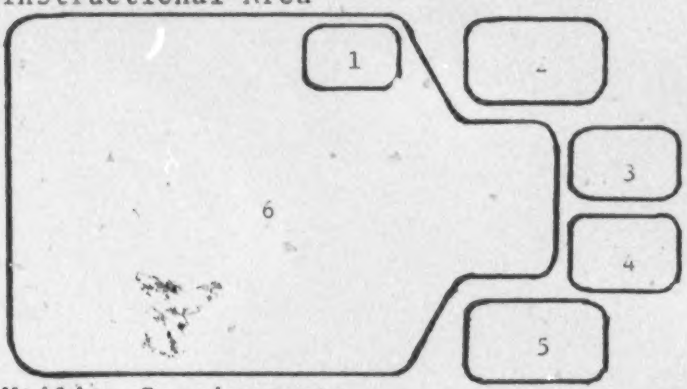
Balance Scales, Basic Chemistry Equipment, Basic Physics Equipment, Physics and Chemistry Demonstration Bench. Water Testing Equipment, Air Pollution Test Equipment, Titration Equipment, Centrifuse Machine, PH Meters, Hot Plates, Furnace, Soil Testing Equipment, Calroimeters.

OE # 17.2304 MACHINE TRADES

Program Activities

The term machine trades is broad and can include many different activities. Because of equipment costs, the complexity of some of the operations and the amount of time available, it is best to place a limit on the amount of equipment and the number of operations to be included. Most school machine shops include bench work, lathe, mill, shaper and ID-OD grinder operations. A certain amount of heat treat and welding may also be included. From a practical employment standpoint it is best to limit the activities of students so that they will have time to develop saleable skills in specific areas rather than numerous shallow experiences in many areas. The advisory committee can be of assistance in determining the depth of the program. This is a good shop in which to train different kinds of machine operators or bench hands as well as all around skilled machinists. There is a place in this kind of shop for students with varying ability levels.

Instructional Area



1. Inspection Room
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration
6. Instructional Area

Utility Requirements

Both 110 volts, 220 volts and 440 volts should be available in overhead busducts. Good lighting and 110 volt wall plugs are necessary in the inspection room. A sizeable gas line along with compressed air is necessary in the heat treat area. Compressed air as well as hot and cold water should be available.

Special Features

A concrete floor is mandated in the heat treat area. A monorail should be installed for moving heavy equipment into the shop. A large door is needed or two small doors with a removable mullion so large pieces of equipment and material can be brought into the shop. Some thought should be given to metal storage, this always presents a problem when dealing with odd size and shaped pieces of metal.

Equipment

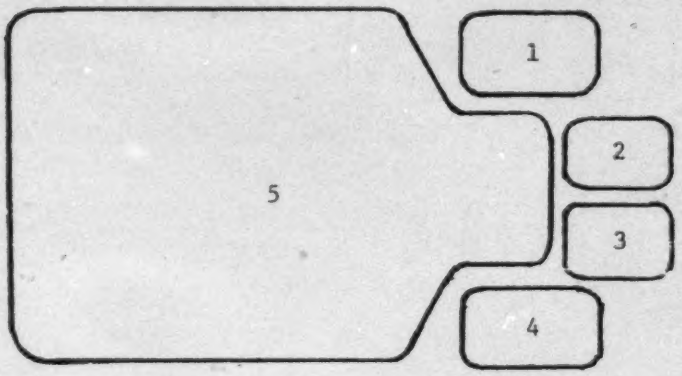
Metal Lathes, Milling Machines, Surface Grinder, Belt Grinder, Radial Drill, Arbor Press, Drill Press, Heat Treat Furnace, Hack Saw, Bench Grinder, Optical Comparator, Lapping Machine, Turret Lathes, Profiler, Die Filer, Oxy-Acetylene Welder, Electric Discharge Machine, Cylindrical Grinder, Hardness Tester.

OE # 17.1004 MASONRY

Program Activities

The masonry program may be part of the building trades operation or it may be a course by itself. The course should be sufficiently comprehensive in fundamentals, while specializing to fit the specific needs of the community and student.

Instructional Area



1. Storage
2. Tool Crib
3. Lockers
4. Demonstration
5. Instructional Area

Utility Requirements

Hot and Cold water should be available. A floor drain with a sand trap is needed. 110 volt wall plugs should be installed and 220 volts should be available. Compressed air is necessary.

Special Features

A sprinkling system to keep down dust when working with cement and lime is necessary. A ventilating fan to remove dust is also helpful. A section of earthen floor in the shop is necessary to practice putting in footings. A fenced in area outside to store block, brick, sand, etc. is essential. A cement pad outside the building will permit brick and block work to be carried on outside.

Equipment

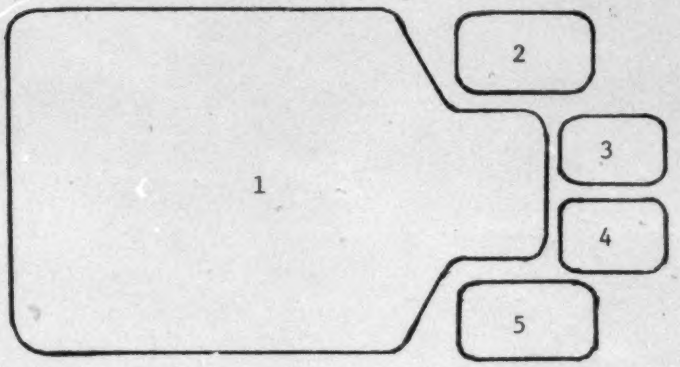
Cement Grinder, Cement Mixer, Mortar Mixer, Scaffolding, Masonry Saw.

OE # 17.1007 PLUMBING-PIPE FITTING

Program Activities

Plumbing may be taught as a separate course but, it is also an apprenticeable trade. It may be taught as part of a heating or air conditiong course or it may be part of a building trades program. In addition to the installation of all types of plumbing fixtures, it also includes the servicing of present installations.

Instruction Area



1. Instructional Area
2. Tool Crib
3. Lockers
4. Storage
5. Demonstration

Utility Requirements

Compressed air and gas are needed in the plumbing shop. Both hot and cold water outlets and a floor drain is necessary. A ventilated fume hood is needed over the load melting pot. Both 110 volt and 220 volt electricity should be available.

Special Features

The framework for two or three bathroom installations should be built in the plumbing shop. Some thought should be given to the planning of storage area as various lengths and sizes of pipes are sometimes difficult to store neatly.

Equipment

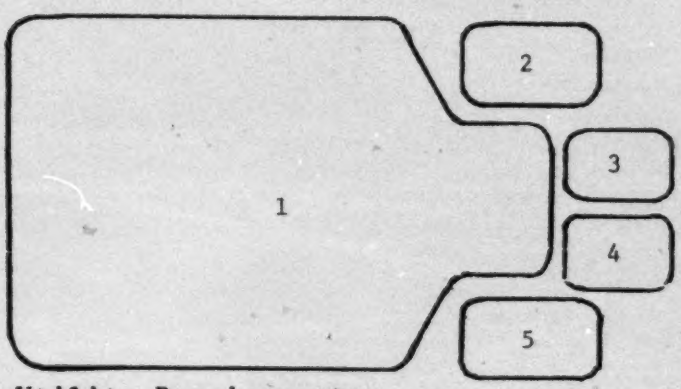
Power Pipe Threading and Cutting Machine, Hydraulic Bending Machine, Drill Press, Bench Grinder Soldering Furnaces, Oxy-Acetylene Welding Outfit.

OE # 17.2305 SHEET METAL

Program Activities

While sheet metal is a separate trade, it is closely allied with other trades such as heating, ventilating, refrigeration and air conditioning. It may be taught separately or in a number of cases, phases are taught as part of another trade. This type of work involves layout, development of patterns, cutting, forming, fabricating and fastening sheet metal parts.

Instructional Area



1. Instructional Area
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration

Utility Requirements

Hot and cold water should be available. Compressed air in addition to gas is necessary. A normal number of electrical outlets along the wall and a 110 volt overhead busduct should be sufficient for electric power.

Special Features

Adequate ventilation in the form of a fume hood should be provided for the soldering and spot welding area. A sheet metal shop requires a considerable amount of clear bench space.

Equipment

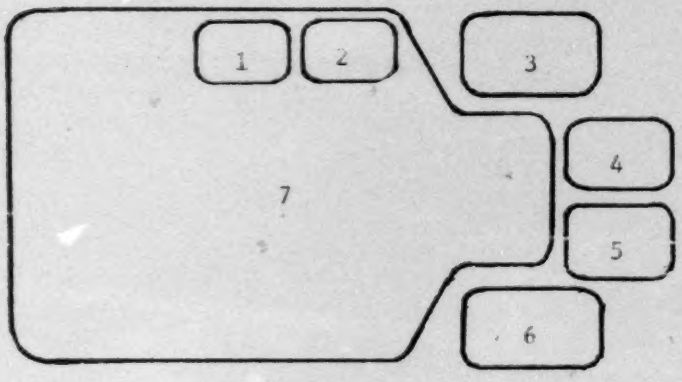
Squaring Shear, Brake, Bar Folder, Strip Roller, Slitting Shear, Hand Nibbler, Punch Press, Spot Welder, Forming Machine, Drill Press, Oxy-Acetylene Welding Outfit, Bench Grinder, Press Brake, Lock Former.

OE # 17.33 TEXTILE FABRICATION

Program Activities

The program title may vary from location to location and such names as Fashion Design, Clothing Fabrication, Design Tailoring, Commercial Clothing, Dress Making and Design, Garment Construction, Commercial Sewing, etc. may be used. In addition to power sewing machine operation such activities as drapery making, slip cover making, clothing alteration, tailoring, etc. may be carried on to give the student a broad background of skills leading to numerous employment opportunities.

Instructional Area



1. Dressing Room
2. Dressing Room
3. Storage
4. Tool Crib
5. Lockers
6. Demonstration
7. Instructional Area

Utility Requirements

An overhead busduct carrying 110 volt and 220 voltage should be installed for flexibility purposes. Numerous 110 volt plugs should be installed along the walls. Hot and cold water and a sink is necessary. Better than average lighting should be provided.

Special Features

Two small fitting rooms are necessary if alternation work and/or tailoring is to be conducted as part of the class work. Large tables with clear working space are needed for layout work. Built-in flexibility is essential. If slip covering is part of the course, space for furniture is required.

Equipment

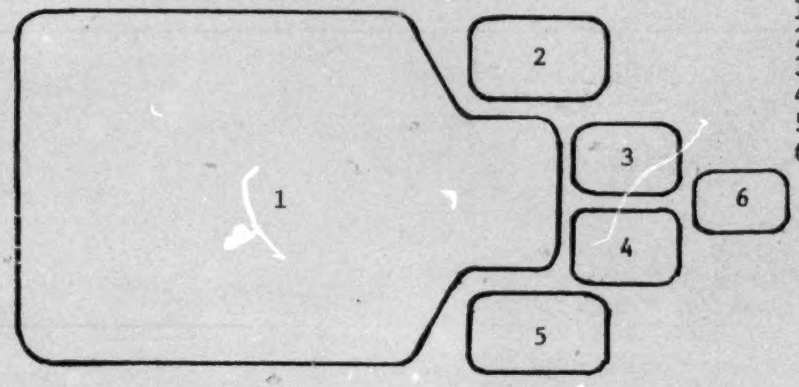
Commercial Type Power Sewing Machine, Mannequin, Blind Stitching Machines, Fabric Cutter, Pressing Machines, Steamer.

OE # 17.230603 WELDING

Program Activities

Welding demands considerable manual dexterity to manipulate the torch and rod or electrodes. It takes much practice to develop the necessary skills. Welding fulfills the needs of a large group of students who have good manual dexterity. A welding program may be devoted exclusively to oxy-acetylene, it may be limited to electric arc, or in some instances, devoted to specialized exotic gas welding. By offering a combined program, more employment opportunities are made available.

Instructional Area



1. Instructional Area
2. Storage
3. Tool Crib
4. Lockers
5. Demonstration
6. Tank Storage

Utility Requirements

An overhead busduct of 110 volt and 220 voltage should be installed along each wall where the electric arc welders booths are to be located. 440 volts should be available in the shop. A water supply and drain system is necessary. Gas and compressed air should be made available.

Special Features

Electric arc welding booths should be installed along one wall. Ventilation is important in a welding shop. Ventilating hoods must be installed at each electric arc station. A gas manifold should be installed down the center of the shop for approximately 15 oxyacetylene welding stations. A ventilating hood is needed here also. There should be a cylinder storage area outside the building on a concrete slab and protected from the weather. The area should be protected by a fence. The tanks must be secured to the wall.

Equipment

Arbor Press, Metal Shear, Drill Press, Hardness Tester, Induction Welder, Tensile Tester, Notcher, Cut-Off Saw, Cutting Machine, Bending Machine, Impact Tester, A.C. Welders, D.C. Welders, Oxy-Acetylene Welding Outfits, Inert Gas Welding Unit, Inert CO Gas Welding Unit, Spot Welder, Tungston Inert Gas Welder.

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OTHER VOCATIONAL-INDUSTRIAL-TECHNICAL FACILITIES

Many other shop and laboratory facilities are classified within the area of vocational-industrial or technical education. Because of the small number of schools that normally make available such programs, suggested facility guidelines are not included in this publication. Some of these areas are:

Cabinet Making-Millwright
Commercial Photography
Data Processing
Maintenance Mechanic
Painting and Decorating
Upholstery
Building Maintenance
Radio-Television Repair
Tool and Die
Environmental Control
Stationary Engineering
Construction Technology

Many different combinations of shop facilities may be grouped (clustered) to serve specific needs.

The Director of Technical Education will assist whenever necessary in the planning of new facilities.